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"CORN STATES"

in the

PRODUCTION OF FOOD

ALTHOUGH conserving food by restricted rations was stressed as a military necessity of the First World War, through fruitful researches on problems of nutrition, increased per capita consumption is now advocated by scientists in that field as a means of maintaining health and reducing disease among civilians and soldiers.

FOOD is undisputably recognized as the world's most important commodity and its production, from the animals and plants of the farm to its use in the home, is governed to an ever-increasing extent by the scientifically determined facts of the research laboratories engaged in the study of nutrition and disease in man and animals.

LOCATED in the heart of an agricultural country, "Com States" fulfills its pledge by supplying college-trained veterinarians with reliant disease-preventing and health-promoting products for the food-producing animals—products that are sanctioned by science, made under careful laboratory control, and approved in the field of practice.

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NO. 770

The Veterinary Situation of the South*

I. S. McADORY, D.V.M.+

Auburn, Ala.

It is customary for the presidents of this association, in their annual address, to review conditions and events of the past year, and so far as they can, point out ways by which the veterinary service may be improved, and the veterinarians of the South benefited.

The past year has been extraordinary in many ways. Grave world conditions have made it a year of great anxiety. Forces have been unleashed in Europe that endanger all democracies and perhaps our civilization. Scientific discoveries, developments, machinery, technical methods that we thought would be blessings only are being prostituted to evil purposes; to brutally destroy those things we hold dearly. These are life, liberty and the pursuit of happiness to which may be added those things that remind us of the struggles of our forebears and the lessons they taught. It is our duty to do our best to aid the forces opposed to dictatorships and to so strengthen our spiritual and material defenses that our democratic form of government will not become a victim of the evil forces that are disturbing the old world.

The livestock industry of the southern states is rapidly increasing. Because our

foreign markets for cotton have been lost and substitutes for it have been developed, it is becoming more and more necessary to turn to other farm products. Fairying and the raising of livestock, because of the good done to the soil, are the logical industries to which we should turn to give the help that is so greatly needed in the southern states.

The health of animals must be protected to make the livestock and dairy industries successful. This can be done by the proper coöperation of the practitioner, the state regulatory officials and the U. S. Bureau of Animal Industry.

The tractor has replaced horses and mules to some extent in the South. Yet, there are still many of these animals used in farming, and probably will be so used for many years to come and they will need veterinary service. I can not believe that animals such as horses and mules that have served man so faithfully through the centuries will ever be discarded.

Small animal practice in the cities has increased much in recent years and there is a great need for veterinarians in dairy and meat inspection, field inspection and for research.

Some animal diseases have received much attention during the year: rabies, Bang's disease, equine encephalomyelitis, parasitic diseases of all species of animals, tubercu-

^oThe presidential address delivered before the Southern Veterinary Medical Association, Birmingham, Ala., November 13, 1941.

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losis of cattle, swine and chickens, pink eye of cattle and Johne's disease. Bang's disease has brought many veterinarians back into the fold and it has made them evaluate their profession. As you know, many veterinarians abandoned the profession for other work in past years. Some of these have returned for tuberculosis eradication work. This work and the public approval it has brought, has stimulated them to study and take the federal examination for junior veterinary inspector, to become federal meat inspectors, field inspectors in the Bang's disease program, and in research. There has been some progress made in the control of rabies. The vaccination of dogs against rabies has been widely practiced. But we must bear in mind that though this method affords considerable protection. it is by no means perfect. The imperfection of rabies vaccination had evidently not been taken into account by some of us and as a result, some clients have lost faith in this vaccination. We do not claim that it is the only step to be used, but we do know that vaccination will help to control rabies.

BANG'S DISEASE

The federal-state program for combating this malady has made good progress, but it has been somewhat expensive and seemingly needs the help of a method to increase resistance and prevent herds from becoming infected and reinfected. The federal Bang's disease program has and still is giving employment to many veterinarians.

Brucellosis of swine exists to some extent

in the Southeast. Veterinarians are advised to be on the lookout for it. The infection in swine does not cause as many abortions as *Brucella abortus* in cattle. However, the infection in swine is found in more foci than in cattle and its causal agent is more pathogenic for man than the bovine germ. It, therefore, behooves the veterinarian to take precautions to protect himself as well as others against infection.

TUBERCULOSIS

Though all of the southern states are in the modified accredited areas, this does not mean that there is no animal tuberculosis in the South. It means only that the incidence of the disease has been reduced to ½ of 1 per cent or less in each of the states and not that the last case of the disease has been found and eliminated. We must, therefore, be alert for cases of tuberculosis and eliminate them before they become spreaders.

ENCEPHALOMYELITIS

Encephalomyelitis of horses and mules has attracted much attention during the past few years. In 1938-1939 the losses from that disease reached a high point in some parts of the country. It seems that the disease has a tendency to decline from natural causes and in part from increased use of vaccine.

Some of the vaccinations made this year with vaccines left over from last year have caused trouble. The U.S. Bureau of Animal Industry immediately recalled all



Alabama Polytechnic Institute's new veterinary school building.

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vaccines prepared in 1939. A method of administering chick-embryo vaccine intradermically has been developed and it may prevent similar vexatious results. Dr. Schoening, chief of the Bureau's division of nathology, and his associates have recently reported results of experiments indicating that the administration of 1 or 2 cc. of vaccine intradermally, and repeated in about a week affords as much protection as ten times as much administered subcutaneously with no bad sequels even when the old vaccine that caused trouble when injected subcutaneously was used. An interesting and important fact was brought to light last year. Examinations of brains of suspected animals by the Bureau of Animal Industry's laboratory in Maryland, proved that both the eastern and western types of the disease were present in Alabama. We must not forget that all cases showing symptoms similar to those of encephalomyelitis are not due to this disease but that some are caused by the consumption of spoiled feed.

HOG CHOLERA

This disease continues to take a big toll in most of the southeastern states. I am sure it does in Alabama. The improper use of virus by persons who do not realize the danger of administering virus to hogs not in a condition to receive it and of administering insufficient serum, makes it necessary to emphasize the danger of giving virus. There is no doubt that many outbreaks of hog cholera are caused by careless and unwise use of virus.

ANTHRAX

This disease which affects but a small area this year or next must always be kept in mind. The good roads and motor transportation from one section to another require close watching. In Alabama we have had some trouble but with rigid quarantines, sanitary measures, and the use of killed vaccines we have thus far been able to control anthrax. If this method fails we may be forced to the use of living spore vaccine on infected premises only but this may not solve the problem. As long as any of the living vaccine is used as it is in

some parts of the country just so long will we have more trouble.

PARASITIC DISEASES

These diseases are important and a great plague to animal industry. Rigid sanitary measures, or as near as we can approach them, together with the use of anthelminthics will help control worm parasites. In this connection, it is encouraging to know that many parasites have been controlled by the newly used drug, phenothiazine. In small animal practice many agents have been used with good results.

INFECTIOUS KERATITIS OR PINK EYE OF CATTLE

This trouble has been prevalent in Alabama during the year. It causes animals to lose condition. Some become permanently blind, while others lose the sight of one eye. We are now investigating this malady at Auburn. It has been proven to be inoculable from animal to animal but the causal agent has not yet been isolated. It seems to be the same disease that was discovered several years ago by investigators of The Rockefeller Institute for Medical Research at Princeton. The New Jersey disease responded readily to treatment with zinc sulfate and the Alabama disease appears to do the same. The disease invades our best herds as well as the more common ones. Affected animals lose flesh, make poor feeders and often the owners can not show or sell them. The disease is quite troublesome and sometimes affects a large percentage of the animals in a herd.

NUTRITIONAL DISEASES

These no doubt play an important part in hampering the development of our livestock industry. It is believed the study and the dissemination of information concerning feeds and feeding among livestock owners will do much to improve conditions in this respect.

There seems to be a tendency among livestock owners, at least by those of limited experience, to own more animals than they can properly feed and care for. Pastures are overstocked and the animals are driven to eat poisonous plants through

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lack of proper nourishment or they become the prey of microörganisms of low virulence that would not affect animals of normal resistance.

The severe weather last winter, preceded by a drought that dried up the pastures and lack of other feed, coupled with unusually cold weather, caused many animals, especially cattle, to die of starvation, cold and exposure.

It is advisable that veterinarians advise their clients to limit their livestock to the number they can properly feed and take care of and to remember that a few wellfed animals are more profitable than a much larger number of half-starved ones.

Many of the old practices, especially in surgery, have stood the test of time. While they have been improved and added to, the original facts are still the foundations of modern veterinary practice. Much has been given to us by research that aids in diagnosis, in understanding how diseases are transmitted and how immunity is acquired, and also many new useful drugs have become available. However, some alleged discoveries have not proved to fulfill our hopes, and we are led to believe that the Biblical saying, "Prove all things and hold fast to that that is good," is advice as excellent for the veterinarian as it is for everyone.

ETHICS

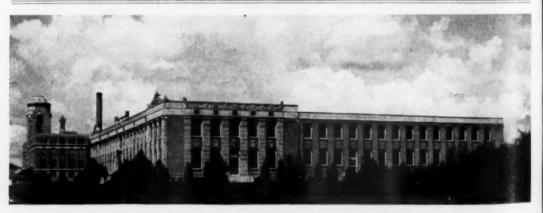
The greatest drawbacks to real substantial progress are jealousy, greed, insincerity, laziness and lack of true sportsmanship. Jealousy hinders a man from doing his best and if allowed free rein will lead

to no good end. Greed makes fruitful coöperation impossible and tends to make our profession a means of getting money rather than earning it. Insincerity is sure sooner or later to lead to losing the confidence of the public. Laziness of body and mind tends to kill initiative and leads to degradation instead of progress. No one should stand still. The veterinarian who does not spend considerable time in study can not hope to render efficient service or keep the confidence and respect of the public. His duty to country and profession is to help to advance in every way he can. An excellent way is to render efficient service. If you do that, you will get a lot of free advertising from satisfied clients that will bring more practice.

There is nothing more to be admired than good sportsmanship, willingness to do more than your share, to take hard knocks without complaint, and never to take an advantage you have not earned.

I believe that if we adhere to these principles and let the public know that the veterinary profession has something real to give for the fees received, not by any particular veterinarian but by the profession as a whole, much will be accomplished for the veterinarian and for the livestock industry.

I do not know what would be the best way of getting the facts to the public. Perhaps short radio talks, in which some of the things that the profession is doing are told. The training required to fit one for the profession could be emphasized. At any rate, let us do our best to create as



A view of the veterinary hospital at Texas A. & M. College.

Bang's Disease with Special Reference to Control by Vaccination*

B. M. LYON, TV.M.D.

Pearl River, N. Y.

WHEN ONE considers that epizoötic abortion of cattle was recognized in the early part of the 18th century in England and Continental Europe, it is apparent that progress in the successful control of the disease has been slow.

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Frank reproduced the disease by introducing material from aborting animals in 1878. In 1897, Bang reported the isolation of a bacillus with which, in pure culture, he was able to reproduce the disease. His work was later substantiated by McFadyean and Stockman of England and by others. MacNeal and Kern in 1910 were the first American workers to identify the Bacillus abortus of Bang from infected cattle in the United States. Thus, it has been 43 years since the causative organism was isolated, and 30 years since it was identified in this country.

Much additional impetus was added in the control of the disease in cattle, following the announcement by Alice Evans in 1918 that the organism causing Malta fever in man and that causing infectious abortion in cattle were indistinguishable. However, it was six years later (1924) that Keefer of Johns Hopkins reported the first case of human brucellosis. In the years immediately following Keefer's report more and more cases referred to as undulant fever in man were recognized and the control of the infection in cattle assumed new importance from a public health standpoint.

Subsequent to the increased recognition

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Association, Birmingham, Ala., November 13-15,

of human infection, appropriations became available in rapid succession from various institutional, state and federal sources for the study of the diagnosis, transmission and control of the disease.

CONTROL

At the present time we have three recognized methods of control:

- 1. Blood test and segregation
- 2. Blood test and slaughter
- $3. \begin{tabular}{ll} Vaccination \\ adult vaccination \\ \end{tabular}$

The test and segregation method has been confined chiefly to scattered herds and not applied on any state- or area-wide basis. In a few instances where facilities are available for the maintenance and complete separation of the infected and noninfected animals and where supervision is exceptional, a measure of success has been achieved. However, such a plan in most instances has not been successful for the reason that the average farm does not permit complete segregation of the infected herd. There exists that constant threat of exposure due to the close proximity or to the failure of the owner or herdsman to fully appreciate how readily the infection is transmitted from a diseased animal. Disregard for the highly infectious nature of the vaginal discharges, the fetal membranes at time of parturition, and the udder secretions of heavily infected animals as potential sources of infection, is a major cause of failure in the test and segregation plan.

The test and slaughter method so widely promoted by state and federal programs, with which we are all more familiar, has resulted in an appreciable reduction in the number of infected animals and in the development of many disease-free herds. However, it is now recognized that the

many satisfied clients as possible by giving them the best that is in us and trust to them to let their neighbors know that we are worthy.

[†]Animal pathologist, Lederle Laboratories.

⁽Continued from preceding page)

measure of success attained has been accomplished at a great cost in subsidies or indemnities and at the sacrifice of many valuable cattle and irreplaceable blood lines.

We likewise all appreciate the problem of maintaining a disease-free herd once it is established. For individual herds, the problem has not been too difficult, and many herds have been kept free of infection for several years. If this were the history of the average herd, the control problem would be relatively simple. However, too frequently, when success seems assured, breaks or reinfections occur, singly or repeatedly, resulting in economic losses which either embarrass the owner financially or shatter his confidence in the plan. The number of such instances has brought a considerable backfire on the test and slaughter plan of control.

CONTROL BY VACCINATION

For years, it has been recognized that by vaccination with living culture of *Brucella* abortus, cattle may be rendered highly resistant to infection and the percentage of abortions greatly reduced.

McFadyean and Stockman of England proved many years ago that the use of a massive single injection of living culture would reduce the abortion rate to a minimum. However, there was some evidence that the promiscuous use of a fully virulent culture might result in dissemination of infection and would likewise conflict with the test and slaughter program of the state and federal authorities.

Thus, the commercial production of living vaccines from a fully virulent culture of *Br. abortus* was no longer permitted, and a new strain designated as No. 19 developed by the U. S. Bureau of Animal Industry was the only culture from which a living vaccine was permitted to be prepared and sold.

The killed-culture bacterin used extensively for several years was discontinued. It was claimed that little or no immunity was induced by such a bacterin and that agglutinins conflicting with the blood testing programs were produced by it in adult cattle.

As early as 1917, vaccination experiments were begun by the U. S. Bureau of Animal Industry. As this study progressed and both adult cows and unbred heifers were vaccinated there was much evidence indicating that vaccination of heifers was more effective than vaccination of mature cattle.

In 1925, Hart and Traum of California reported the results of controlled studies which seemed to confirm the findings of the U. S. Bureau of Animal Industry. In these experiments, for instance, it was shown that 16 out of 17 vaccinated heifers remained free of infection, produced full-time calves, although exposed to Br. abortus sufficiently severe to cause 6 of the 10 unvaccinated control animals to become infected and abort. When the same vaccine was given to 16 lactating cows, 10 were shown to eliminate Br. abortus in the milk.

The Bureau investigators and Hart and Traum concluded that the vaccination of heifers was effective and was not objectionable from the standpoint of harboring or transmitting the infection to disease-free animals. On the other hand, it was shown that vaccination of adult cows with virulent strains may result in vaccinal infection of the udder and the elimination of the organism in the milk which rendered these cattle unfit as additions to disease-free herds.

It was reasoned that since the *Br. abortus* organism has a predilection for the organs of reproduction, the unbred heifer is less likely to become infected and act as a spreader because its udder and generative organs are immature. Vaccination experiments seemed to prove the correctness of this hypothesis.

A step to obviate some of the objectionable features of the fully virulent strain came when Huddleson reported in 1926 that a considerable degree of protection could be induced in guinea pigs and cattle with an avirulent strain of *Br. abortus*, and that the strain could be given as a vaccine to pregnant cows and heifers with safety.

A year or so later, Cotton and Buck conducted repeated experiments with a culture of low virulence. The results of four M.A.

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of these experiments were summarized as follows:

In the control group

- a) 36% produced full-time calves
- b) 27% failed to become infected
- e) 64% aborted or gave birth to weak calves

In the vaccinated animals

- a) 93% produced vigorous full-time calves
- b) 80% resisted infection entirely
- c) 7% aborted or gave birth to weak calves

Two later experiments reported by them gave similar results. In one of their tests it was shown that vaccination of calves has a distinct advantage over vaccination of more mature, unbred yearling heifers. The agglutinins developed by the vaccination disappear more promptly and regularly in such animals.

To summarize the advantages of calfhood vaccination over vaccination of older animals, they stated:

- 1. The danger of inducing abortion by inadvertently vaccinating pregnant animals is practically eliminated.
- 2. The danger of the vaccine infecting the udder is remote.
- 3. The agglutinins induced subside to a low titer or entirely disappear more rapidly than in adult animals.
- 4. If, by rare chance, an animal becomes a carrier as a result of vaccination, it could be detected by the agglutination test and eliminated before being bred.

These investigators further stated that these advantages, together with the substantial and probable lasting immunity which experiments indicate is conferred, led to the belief that this method, used in conjunction with the agglutination test, may prove to be a valuable aid in controlling Bang's disease. They further state that the disease may be eradicated from herds and leave them not only free from infection but also with a substantial degree of resistance against reinfection.

Hardenbergh, reporting his studies of vaccinal control of Bang's disease in the Walker-Gordon Laboratories' herd where from 1500 to 2000 cows are maintained in the milking line, came to the following conclusion:

Vaccination of calves at the proper age does not interfere with the blood testing program when the heifers mature and enter the producing line. The abortion rate in vaccinated heifers is less than in the unvaccinated control animals and they do not react to the blood test following natural exposure to as great an extent as do the controls.

Of the 625 cattle vaccinated at the Walker-Gordon plant, 80 per cent of the vaccinated heifers whose agglutination titers were studied, became completely negative within four to six months. In about 20 per cent, a low titer (1:50 or 1:100) was maintained for a longer period. These low titers were not found to be associated with any permanent infection with the Strain No. 19 culture. Only one heifer of the 625 retained a blood titer indefinitely.

Hardenbergh further concluded that in the so-called problem herds where reinfection keeps cropping up, the proper use of calfhood vaccination may be helpful in the ultimate control of the disease.

In support of this conclusion, L. J. Tompkins, associated with the Sheffield Farms, Inc., one of the largest commercial producers and distributors of milk in the New York area, recently published a report covering a three-year study of calfhood vaccination in a so-called problem herd. (This herd was so designated because of the difficulty found in controlling the infection.)

Vaccinated first-calf heifers were concentrated in this herd to determine whether they would withstand the infection. In summarizing the published tables, Tompkins concluded that animals vaccinated at 5 to 7 months apparently had a resistance to

W. L. Gates, AVMA secretary for Mississippi; intrepid general practitioner of Clarksdale.



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the grade of infection prevalent in this problem herd.

The summation by Tompkins of 391 gestation periods of vaccinated heifers indicates the satisfactory results obtained when checked by the agglutination test.

In a total of 391 gestation periods, covering from 1 to 5 years, the titers were as follows:

- 365 negative
 - 9 partial or complete 1:25
- 12 partial or complete 1:50
- 1 partial 1:10
- 4 complete 1:200 (Remained high from vaccination until sold)

Total 391

The study further showed that there was a tendency to return to a strictly negative status as the animals became older.

Tompkins' studies, reported in December 1939, covered a period of almost six years and they comprised the vaccination of 60 groups totaling 708 calves. His conclusions were as follows:

- 1. All individuals after vaccination showed a pronounced agglutination response. The time required to return to a negative blood status varied widely with individuals.
- 2. A few individuals carried a high titer without any recession, at least through their first lactation period.
- 3. Some individuals carried a low titer for months with a strong tendency to become negative in time.
- 4. Calfhood vaccination eliminated the danger of vaccinating adult or pregnant animals. The general behavior of the reactions following calfhood vaccination was such that they were not too confusing when interpreting the subsequent herd tests.
- 5. The administration of a vaccine prepared from *Br. abortus* strains with the low virulence of Strain No. 19, seems to be practically free of danger when used on calves from 5 to 7 months old.
- 6. Clinical abortions and retained placentae occurred in animals vaccinated at calfhood, but apparently from other causes than *Br. abortus*, when the agglutination blood test was used as the indicator of *Br. abortus* infection.
- 7. Vaccination with Strain No. 19 at the proper age seemed to take off the "edge in susceptibility" and acted as good insurance against Bang's infection.

The continued interest in calfhood vaccination during the early 1930's resulted (1936) in the U.S. government starting a

field study in selected herds throughout the country. This study has now covered a period of more than four years, but no of. ficial report has yet been released by the federal authorities. However, it has been unofficially stated that the results are so encouraging that a plan has been formulated by which vaccination will be encouraged. It is further anticipated that the report of the study, as well as the proposed Bureau vaccination plan, will be announced this fall,* and will be a real impetus to vaccination.

EFFICIENCY OF VACCINES

The antigenicity or immunizing value of Br. abortus vaccine depends upon several factors:

First, the organisms constituting the vaccine must be alive and fully active. Dead or inactive suspensions of *Br. abortus* possess little antigenic power.

Secondly, the vaccine, to induce the best protection, must be prepared from the so-called "smooth" forms in distinction to the "rough" forms known to have poor immunizing value.

Third, the vaccine should be a pure culture of *Br. abortus* and not contaminated with organisms of other species.

Soon after the U.S. Bureau of Animal Industry began vaccination experiments, an investigation of the various commercial abortion vaccines on the market revealed a wide variation as to the type, purity, viability and virulence of cultures used. When the results of this investigation were revealed it was plainly evident why results following their use differed so widely. Many vaccines were shown to contain only dead organisms. When nonliving products were used the results were unfavorable. It had long since been shown that the killedculture bacterin induced but little immunity. For that reason it was withdrawn from the market. Other vaccines were shown to be so heavily contaminated as to contain a very small percentage of active Br. abortus. Still others on the market were found to

^{*}The government's plan was announced by John R. Mohler, A. E. Wight and H. M. O'Rear at the 1940 meeting of the U. S. Live Stock Sanitary Association and was published in the January, 1941 issue of the JOURNAL.

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be so virulent that they were capable of establishing infection in the udder and, when given in error to pregnant animals, they might cause abortions.

Fortunately, much improvement has been effected in commercial vaccines in recent months. Subsequent to the determination that killed-culture bacterin was not of sufficient value to justify its use and permission was no longer granted for its distribution, and after it had been determined that a vaccine prepared from a living culture of low virulence was effective and less hazardous, producers rapidly switched to the avirulent strain. Soon, the U.S. Bureau of Animal Industry provided all manufacturers with Strain No. 19, and ruled that only vaccines produced from this strain would be licensed. Strain No. 19 has been under artificial cultivation for several years. Its virulence has become established or fixed to the extent that it does not produce lesions in guinea pigs, yet when used immunologically, it is highly antigenic.

Thus, with the adoption of a single or universal strain, vaccines became more uniform and results correspondingly more consistent. However, it was soon determined that this culture, under varied conditions of cultivation and handling by some laboratories, had undergone changes in many instances that some producers were making vaccines consisting chiefly of the so-termed "rough" forms of the organism. Such forms as contrasted with the "smooth," as previously mentioned, possess but low immunizing value. Thus, to assure still further uniformity in marketed vaccines, the Bureau now supplies a new culture of Strain No. 19 to all producers every sixty days. Likewise samples of all Br. abortus vaccine must be submitted to the Bureau for release, prior to distribution.

All these steps toward uniformity in standards should bring a more uniform result.

I have endeavored to give you a brief résumé of the results of a few of the more outstanding studies on calfhood vaccination. The reports quoted were selected because the work was conducted with a sufficiently large number of animals and over a sufficient period of time to justify the conclusions. Moreover, the work was carried out under ideal conditions and was well controlled. If one were to list all of the evidence favoring calfhood vaccination available today it could not be covered in a brief half-hour discussion.

SUMMARY

1. The test and segregation plan has failed chiefly since the average farm facilities are inadequate for proper segregation. The plan is impractical especially on an area or state-wide basis.

2. The test and slaughter method has been successful in greatly reducing the number of infected animals, but at too great a cost in indemnities paid and loss of valuable producing animals. Likewise, repeated reinfections with corresponding recurrent losses have been too general and of sufficient number to discourage many of its ardent advocates and supporters.

3. Evidence has been rapidly accumulating over the past five years, and especially in recent months, indicating that the vaccination of young calves with an avirulent living-culture vaccine, combined with blood testing, offers a practical, economical, and effective method of building resistant, disease-free herds.

This evidence indicates: A). Calves vaccinated at the age of 4 to 8 months lose their agglutinins induced by vaccination earlier and more regularly than older calves.

B). With few exceptions, calves vaccinated at this early age lose their agglutinins completely or retain them in a very low titer by the time they reach the reproductive age. The occasional animal failing to return to normal may be eliminated by the blood test.

C). Vaccinated calves, when placed in disease-free herds, do not present an infection hazard, since the avirulent cultures have not been recovered from such animals, either from the udder or fetal membranes following freshening.

D). Vaccinated calves possess an increased resistance to infection over that

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of unvaccinated animals, and are, therefore, more desirable as replacements, for infected or noninfected herds.

E). Recent improvement in the antigenic value of vaccines will tend to produce more uniform results and increased effectiveness of the vaccination program.

DISCUSSION

Dr. D. M. Campbell.—The speaker said that calfhood vaccination combined with the blood test would produce herds of resistant, disease-free animals but he did not say how these are combined to accomplish that end, as the whole paper implies. That is one question, I would like to have answered.

Another question .- There seems to be no justification for saying that vaccinated herds will be kept disease-free since for every herd that has remained free of the infection there have been other herds that have reached that end even where the infected animals were not removed. There is something about bovine brucellosis that makes it attack some herds and not other herds. We do not know why. The speaker said repeatedly that if the vaccination is confined to calves the danger of vaccinating pregnant animals is avoided. There is no danger in vaccinating pregnant animals. The vaccine does not cause abortion. So where is the danger? The experiences of Haring and others in California show beyond doubt that the quickest way to get a brucellosis-free herd is to vaccinate all of the animals in it, not only the calves. On these points I was unable to understand the speaker.

Dr. Lyon.—In reference to the justification for using both vaccination and test, most of the original work indicated that an occasional animal did carry over a high agglutination titer and as such might be undesirable as a replacement for a negative herd. Such animals can be removed by the test if thought advisable. Yet the more recent work which I reported indicates that there is not the danger in leaving such an animal in the herd that the early workers assumed.

As to the danger of vaccinating pregnant animals, the reproductive membranes are in a most favorable condition to harbor *Br. abortus* during pregnancy. Whether pregnant animals should be vaccinated is a debatable question. It is being done, I admit, but under the present recommendation of the U. S. Bureau of Animal Industry only animals between 4 and 8 months of age should be vaccinated.

I think a great deal of new evidence will be brought out this fall and conflicting data cleared up. My object was to advance only experimental studies and to review data reported to date. Dr. Campbell's questions are good ones, and as I have answered them on the basis of experimental work, I would like to have Dr. Cotton comment on them.

Dr. W. E. Cotton.—In studying vaccination we have tried to develop it to the point now attained. We took no chances as we wanted it to succeed. The failure of the old method which in England, once upon a time, was thought to be effective, was kept in mind. We wanted to avoid failure again.

Calves were vaccinated, as now advocated, in a scientific manner, in order to study the effect of the culture used. Dr. Buck first called attention to the fact that calfhood vaccination may be the desirable plan since the udder and uterus where this group of organisms grow, are not developed and might serve as an aid in producing immunity without harm in these organs as in older animals.

As to whether there is any danger in vaccinating older animals and as to whether vaccinated calves are dangerous at all, I do believe that the vaccination of pregnant animals is a little risky because it may be that if the organism is passed through a number of susceptible animals, it might interfere with the reproductive process, and we do not want to make any mistakes. I think it best, just now, to feel our way along. Let us practice calfhood vaccination first. If the vaccination of adults proves to be safe that can be done later. Let us avoid having to back-water again as was done following the premature conclusions of our British colleagues. So I am glad that the Bureau is considering only calfhood vaccination to supplement the test and slaughter method, which has done a great deal of good but costs a lot of money. With the world going mad as it is in Europe just now, there may not be enough money available to proceed with the test and slaughter plan, which, supplemented with calfhood vaccination, may finally furnish the solution of the problem.

Dr. Lyon called attention to the smooth and rough organisms which are going to make it possible to hold Strain 19 at the right level so far as virulence is concerned. No doubt, Strain 19 will finally lose its immunizing property but new strains will be brought out to take its place. I do not think, however, that Strain 19 is reverting or that it is the only strain that will serve its purpose, but, the longer it can be kept at the present level, the better. It is by keeping a pure smooth colony that the level can be retained.

The consumption of cheese in the United States has increased 36 per cent in the past ten years. The increase was 100,000 tons from 1930 through 1939. The development of process cheese from the cheddar variety to delectable flavors is said to be the cause of the increase.

Horse and Mule Production*

W. W. DIMOCK, D.V.M.

Lexington, Ky.

THE OBJECTIVE of the breeder is to obtain a high percentage of pregnancies among the mares bred, to have the period of gestation terminate in the birth of live, healthy foals and then to raise the foals to maturity without the occurrence of sickness or accident that will affect their usefulness for the purpose for which they are produced.

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For the United States, as a whole, it is estimated that not over 65 per cent of the mares bred conceive during a given season. Of the number that do conceive a small percentage will abort, there will be some foals dead at birth, from one cause or another, and many fatal cases of navel and joint-ill. Thus the live, healthy foal crop may not be above 50 per cent of the total number of brood mares maintained. There are many procedures that, if correctly carried out, will help to increase the percentage of pregnancies and the number of live, healthy foals produced. Experience has demonstrated that if a definite program is followed, all special phases being taken care of by persons competent to deal with them, the percentage of pregnancies and livability of foals will show an increase that will more than offset the trouble and expense of carrying out the various procedures.

HEREDITY AND NUTRITION

Before taking up the more strictly disease problems as related to the production of horses and mules, it would seem in order to mention briefly heredity and nutrition. It is hardly worthwhile to raise a horse or mule colt that does not have a hereditary background which at least indicates that the animal, when mature, will be of a kind, size and quality that the market demands or be fully serviceable on the farm where

raised. Care and consideration should be given to the selection of mares for breeding and of the stallions and jacks used as sires. Through a more careful selection of mares, stallions and jacks and by eliminating all inferior individuals, the general average of quality and size of the offspring will be raised. There is less and less demand for small, light-weight farm work stock, the tendency being for heavier animals of quality and good conformation. The placing on the market of these less desirable individuals can not help but lower the price and demand for the better quality animal. Reducing the number of horses and mules raised, but making every effort to improve their quality, is a sound policy as I visualize the horse and mule industry today.

From what is known today about heredity, learned from observation and experience and the whole field of genetics, there is no reason why anyone should undertake the production of horses and mules without first giving full consideration to inheritance. Even if it is admitted that most of our real knowledge of genetics is based largely on what has happened rather than by what may result from a certain mating, this knowledge may be made of material value in animal production provided it is correctly applied. A knowledge of genetics, plus the keen insight of the experienced, practical breeder will increase the production of offspring superior to that which might otherwise be obtained.

In feeding animals maintained for reproduction or for any other purpose, the quantity and quality of the feed must be given consideration. The use of mineral supplements has been overemphasized; they are not to take the place of food nor of curative agents of established medicinal action. Today, those substances which under the name of vitamins are known to be essential to proper nutrition, must be taken into ac-

^eFrom the Department of Animal Pathology, Kentucky Agricultural Experiment Station. Presented at the annual meeting of the Southern Veterinary Medical Association, Birmingham, Ala., November 13-15, 1940.

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count in making up a ration adequate for the maintenance of perfect health.

The number of controlled nutritional experiments on horses and mules has been limited, as compared with other species of domestic animals. On the basis of available evidence, it is reasonable to conclude that nutrition in horses as related to reproduction, to livability of foals and to their growth and development, is similar to that of other kinds of animal life.

The cheapest and most satisfactory source of nutritive elements, including minerals and vitamins, essential to fulfill every nutritional requirement of the animal is the natural feed stuffs rather than supplements in concentrated form.

Where animals are maintained under confinement and in areas of the country where the natural available feed stuffs are deficient in some one or more essential food elements, the supplying in concentrated form of the special food elements lacking may be more practical, convenient and economical than to attempt to secure natural feeds containing them. There is considerable evidence indicating that all essential food elements are more readily and easily assimilated and are more effectively metabolized when in the form in which they are found in the natural feeds of animals than they are in synthetic concentrates of even pure chemical form. A great many horses and mules in this country do not receive a sufficient quantity of feed. Much of the feed used is of poor quality and in many instances even where food stuffs are plentiful, the ration is not a balanced one from the standpoint of the common food elements to say nothing of the minor essential elements.

Animal production requires quantities of good feed. The production of feed stuffs of high nutritive value requires fertile soil and it has long been known that animal life, nutritious feeds and soil fertility go hand in hand.

Mention is made of the quality of mares, stallions and jacks constituting the breeding stock and heredity and nutrition because it is believed that it is always advis-

able to consider these problems. In some areas great improvement along these lines is necessary if the production of horses and mules is going to be a successful enterprise. These problems are also of concern to the veterinarian who undertakes to deal with delayed conception, sterility, abortion and other diseases in connection with the production of horses and mules, although they are not usually considered as coming under his direct supervision. Money spent for competent veterinary service in dealing with diseases incident to breeding is, on the whole, money well spent; however, the production of horses and mules will not be a successful, profitable venture with the best veterinary service unless the questions of heredity, nutrition, care and management are given equally competent attention.

DEFINITE PLAN IMPERATIVE

The veterinary practitioner who undertakes work on the control, prevention and cure of equine breeding diseases must decide upon a definite plan of procedure and follow it rather consistently. Although some of the problems to be dealt with are more or less seasonal, it is advisable to keep in touch with the situation throughout the year. Granting that the veterinarian has a definite and specific part to play in carrying out a breeding program, it should also be emphasized that the person who is directly in charge of the management of the mares on the farm has an equally important function to perform. Unless the management program is well conducted, the best efforts on the part of the veterinarian will be less effective, if not completely nullified. The veterinary practitioner will respond to call regardless of the time of year or conditions that exist. To be called upon for the first time to render service in connection with reproduction during the current breeding season, and particularly after a mare has had nonprofessional treatment and many services, usually means that one will find cases of sterility of long standing that are hopelessly beyond correction at an early date, if at all. In such instances the veterinarian does the best he can under the circumstances. It does, however, furLA

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nish an opportunity to explain to the breeder what procedures ought to be followed. Experience has shown that it is most advantageous to know the condition of the reproductive organs of the brood mares and of the sire before the beginning of the breeding season. It is, therefore. recommended that following the close of the breeding season all mares that have been bred should be examined for pregnancy. It is possible to determine pregnancy in the mare by clinical examination 30 to 60 days following conception and quite easily later. Biological tests for pregnancy are quite accurate from the 45th to the 105th day of gestation provided all steps of the tests are properly conducted. The mares found to be in foal should be cared for and fed in a way to give assurance that they will go through the period of gestation adequately

nourished and without suffering from avoidable accidents and injuries.

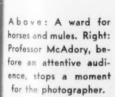
ELIMINATE DISEASE

All nonpregnant mares should, during the fall of the year, be given a thorough clinical examination to determine the condition of the genital tract and reproductive organs. The barren mares found to be normal need no special attention and will be ready for service early the next spring. Those found to have an infection of the genital tract in the form of vaginitis, cervicitis and metritis should be treated as the condition of each individual would seem to indicate. The age, general and particular condition and value of the mare as a brood mare are worthwhile considering in coming to a decision about treatment.

In dealing with the problem of reproduc-



Two scenes from the large animal hospital, Alabama Polytechnic Institute.





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tion in mares and cattle, it is possible to make a visual examination of the vagina and vaginal cervix and to palpate per rectum the uterus, ovaries and adjacent parts and structures. In making a visual examination of the vagina and cervix of brood mares, it is essential that one knows the appearance of the normal, barren mare as contrasted with those changes in the mucous membranes of the genital tract that represent inflammation due to infection. It is not particularly difficult by clinical observations alone to recognize the normal, healthy mare and the mare suffering with a more or less severe form of metritis and There are many border-line cervicitis. cases and for these, it takes some experience and usually more than one examination to accurately classify the cases. For many of these borderline cases it is advisable to resort to a bacteriological examination of the cervical canal. Healthy mares in normal estrum will show a flushed, congested condition of the vaginal cervix resembling, in many respects, mild cases of cervicitis and metritis and vice versa. Even if there is good evidence that the mare is in season and there is no visible evidence of a pathological exudate from the cervix, it is well to delay final decision and arrange to make another visual examination of the genital tract some time later when the mare is known to be not in season.

To prevent infections of the genital tract or to deal with them in the early stages, is far more effective and satisfactory than to attempt to cure well-established and chronic cases.

In cases of metritis with mucopurulent exudate, uterine douches are indicated. For this purpose there are several agents to choose from. Nonirritating chlorinated antiseptics such as veterinary zonite and others have been found to be satisfactory. Acri- and proflavine, aqueous metaphen, azamine and many others have been used quite extensively and under varying conditions with good results. Douching should not be continued longer than necessary to overcome the excessive purulent exudation. When the profuse exudation has been controlled and the uterus has a good tone and

contracts well a few applications of small amounts (½ to 1 pint) of such agents as mineral oil and iodine, aqueous metaphen, 1-3000 azamine in capsule or suspended in oil and other preparations of a similar nature, are beneficial.

THE FLORA OF THE GENITAL TRACT

A great variety of microörganisms inhabit the genital tract of mares. Some of these are purely filth organisms, some are semipathogenic and a few are specific. Since none of them are normal inhabitants of the genital tract, it would seem well to first consider the conditions under which bacteria, of one kind or another, may find their way into the genital tract of the mare

First, the parturient mare should be mentioned. It not infrequently happens, following normal birth of a healthy foal, that contaminated material finds its way into the vagina, cervix and uterus through the relaxed and dilated vulvovaginal canal. In case the mare is in good physical condition, no injuries occur at the time of parturition and involution of the uterus occurs promptly, any bacteria that may have gained entrance to the vagina are rather rapidly expelled through the excretion of physiological lochia. On the other hand, mares in poor physical condition, that are sunken in the perineal region, that are lacerated and abnormally dilated from the delivery of a large foal, that retain the after-birth, and/or that suffer from dystocia and delayed involution of the uterus, are all predisposed to aspiration of air and



J. Gilbert Horning, pioneer small animal practitioner of Houston, Texas.

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contaminated materials into the genital tract for some days following parturition. Particularly is this true where the uterus remains dilated, the cervix open and expulsion of the contaminated material is delayed, permitting the bacteria to become established in the vulnerable mucosa. Unless cases of this kind are properly and effectively dealt with, endometritis and finally metritis will often be the result. Within one to four days following parturition there may be external visible evidence that the mare needs attention. However, it is worthwhile to make a visual examination of the vagina, regardless of the external manifestation, sometime between the second and sixth day after parturition. At least, examine the vagina of the parturient mare once before she is admitted to service. For those mares not making a normal recovery, it is advisable to cleanse the uterus through thorough douching, always draining the uterus as completely as possible and then inserting into it from onehalf to one pint of a heavy mineral oil containing a small quantity of iodine (1/2 dram of iodine crystals in one gallon mineral oil). The number of such treatments depends altogether upon the conditions that exist, particularly as to how rapidly the uterus contracts and whether or not the vulva is severely relaxed or has been lacerated.

In the case of lacerations at the upper commissure or on the side of the vulva at the time of parturition, the laceration should be sutured at once. For a dilated, relaxed vulva it is also always well, after the uterus has been thoroughly cleansed, to suture the vulva at the upper commissure down a distance of one to two inches to prevent continuous seepage into the vagina. A mare that develops vaginitis, cervicitis or endometritis following parturition should not be admitted to service on the ninth day. Many cases will return to normal in the course of two to four weeks without treatment. Recovery is rapid following the nine day period of estruation. If admitted to service, mares whose genital tract has not become normal by the ninth day may be further irritated and the infection become

more firmly established in the uterus. The parturient mare admitted to service on the ninth day following parturition is susceptible to infection introduced at the time of service while the genital tract of the normal, healthy barren mare is highly resistant to bacteria under the same conditions. It is an accepted practice to admit foaling mares to service nine days following parturition. This practice is quite acceptable provided it is known that the mare has made a normal recovery. On the other hand, if recovery has not been normal the service on the ninth day and those that may subsequently follow are very likely to lead to metritis.

The most common cause of infection of the genital tract of mares is streptococci. Neither the parturient mare nor the barren mare affected with streptococcic metritis has much chance of conceiving. A mare with streptococci already in the uterus before service or one in which the infection is introduced at the time of service may later abort from streptococcic infection. Another possibility is that even though the fetus is carried to term, the foal will be found to have streptococcic navel-ill, joint-ill, etc.

GENITAL INFECTIONS AFFECT ALL BREEDS

Our work on infections of the genital tract of mares has been largely with the light breeds of horses. Although the number of heavy draft mares and farm work mares studied has been comparatively small, it is well known that sterility, abortion and infections of the newborn are not uncommon in all breeds and kinds of mares. There is an unofficial record of 16 Percheron mares in one group, representing all on the farm, in which only eight were pregnant at the close of the breeding season. The following spring the eight foals, produced by these mares died with infections of the newborn. While this may be an extreme case it does represent what may happen when the principles of equine breeding hygiene are more or less completely ignored.

At our laboratory of 4,152 mares subjected to a bacteriological examination

of the genital tract, 1,065 (25.64%) were found to have streptococcic infection in the form of cervicitis and metritis. Of 802 cases of abortion, 147 (18.3%) revealed streptococcic infection. Of 590 foals dying within a few days or few weeks following birth, 148 (25%) had streptococcic infection: Thus, it is apparent that the control and prevention of streptococcic infection are sound economics to anyone engaged in the production of horses and mules. This particular infection is emphasized because the prevention of streptococcic infection of the genital tract as related to sterility, abortion and diseases of the newborn is largely, if not altogether, a matter of equine breeding hygiene. Streptococcic infection of the genital tract of mares is always through the vulvovaginal canal. Thus, abortion due to streptococcic infection means that the streptococci were present in the uterus when the mare was bred or were introduced at the time of service. The same is true for streptococcic navel-ill.

Of the mares subjected to a bacteriological examination of the cervix, it was found that the culture tubes revealed, in from eight to ten per cent of the cases, a miscellaneous number of bacterial species other than hemolytic streptococci. Such cases usually revealed, upon clinical examination, distinct evidence of vaginitis and cervicitis and sometimes metritis. Among this miscellaneous group of bacteria mention should be made of Friedlander's bacillus, Klebsiella pneumonia, B. coli, B. pyocyaneus. staphylococci, nonhemolytic streptococci, many unidentified rod-shaped bacteria, molds, fungi, etc. In the main, the above are nonspecific semipathogenic bacteria that have accidentally or through carelessness found their way into the genital tract of the mare. Other microörganisms having a more specific action as pathogens are Salmonella abortivo equinus, Shigella equirulis and Corynebacterium equi.

S. abortivo equinus—may be found in the uterine discharges for some days or weeks following abortion, but only very rarely, if ever, remains for any length of time.

S. equirulis—the most frequent cause of navel-ill, joint-ill and pyosepticemia in foals

has been recovered only in a few cases from the genital tract of barren mares.

Corynebacterium equi—which is sometimes found to be a cause of purulent pneumonia in foals is recovered only rarely from the genital tract of mares.

For all practical purposes, these three species of bacilli (*supra*) need not be considered in dealing with infections of the genital tract of mares except in relation to their specific action as pathogenic bacteria.

The veterinarian, working in full coöperation with the person in immediate charge of brood mares and the stallion or jack and by following a definite program can reduce the occurrence of streptococcic infection to a minimum. The policy should be:

First, to admit to service only mares that have a normal, healthy genital tract. This applies to both the parturient mare and the barren mare.

Second, to mate the mares to healthy, vigorous, fertile stallions and jacks. Third, to observe scrupulous cleanliness at the time of service.

VULVAL LACERATIONS

Mares found to have old lacerations of the vulva and those with a relaxed, membraneous, toneless vulva, especially if sunken in the whole perineal region should be operated upon to close more completely the opening at the upper commissure. In all such cases there is more or less continuous seepage of contaminated material into the vagina through the vulvovaginal canal. Cases of vaginitis involving the vaginal cervix will recover, without medicinal treatment before or following the operation. The operation is also most helpful for mares after treatment for metritis as in most cases of metritis of some duration, the vulva is found to be relaxed thus reinfection occurs even before recovery has become complete. Suturing the vulva following a normal parturition is advisable for many mares. It is indicated in cases where the vulva was greatly dilated and remains dilated and relaxed for some days following parturition, when the physical condition of the mare is subnormal and where the natfrom

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ural conformation of the parts of, and directly adjacent to, the perineal region tend to predispose to the entrance of air and contaminated material into the vulvovaginal canal.

OVARIAN TROUBLES

Ovarian trouble undoubtedly stands second to infection of the genital tract as a cause of delayed conception and sterility in mares. Many apparently normal barren mares fail to conceive when bred because of structural and functional disturbances of the ovaries. In going over a group of mares one will find great variations in the size, shape and texture of the ovaries. Mares with cystic ovaries may show two extremes so far as the period of estruation is concerned. Some go for long periods without coming in season while others come in season often and have a tendency to stay in season longer than the normal period; still others may be quite regular, that is, estrum occurs every 18 to 21 days.

Some ovarian disorders are:

- 1. Cystic ovaries
 - (a) Large cysts
 - (b) Small multiple cysts
- 2. Fibrosis, with or without cyst formation
- 3 Tumors
- 4. Functional disturbances
- 5. Atrophy

Cysts on the ovary may not in themselves prevent ovarian function and conception. On the other hand, they frequently do. It is also true that the cysts may occasionally disappear without intervention. More often they remain, and the longer they remain, the greater becomes the danger of permanent injury to the functional part of the ovarian tissue.

TREATMENT OF OVARIAN CYSTS

The most effective and logical procedure in dealing with cystic ovaries of the mare is the operation known as tapping or puncturing. The removal of fluid from the ovarian cyst relieves pressure and allows undamaged ovarian tissue the opportunity to function. Draining ovarian cysts in the mare is not difficult and usually gives almost immediate relief provided the func-

tional tissue of the ovary is not already destroyed.

It is not to be assumed that all mares with cystic ovaries will fail to conceive or remain permanently sterile if the cysts are not punctured. Although a certain percentage will conceive during the breeding season, others will conceive the following season or subsequently. However, it is not often possible to tell from a clinical examination which mare will conceive without an operation nor which one the operation will benefit. It is known that a certain percentage of mares with cystic ovaries become progressively worse, the cysts becoming so large or so numerous as to ultimately destroy the functional tissue. Therefore, it always seems advisable to proceed with the operation rather than to wait for what may happen. If found in the fall or winter that a mare has a cystic ovary or ovaries and for one reason or another it is not advisable to operate at the time, the mare may be given two or three services in the spring. If she continues to come back in season and the cysts on the ovary remain, there will still be time to operate even as late as May or early June, and breed the mare the same year. It is recommended that the mare be bred the first time she comes in season following the operation.

For mares with cystic ovaries, especially for those that do not come in season at regular intervals and for functional disturbances of the ovary in which cysts do not seem to be a factor, the use of the

M. W. Emmel, prominent research worker in the veterinary service of Florida.



various glandular extracts now available as a method of correction is worth trying.

In dealing with ovarian trouble in mares one should always have, in addition to the information gained from the examination, a mare's record as a producer of foals and the regularity of periods of estruation. Mares with cystic ovaries show a wide variation as regards the periods of estruation. Some come in season regularly, others come in too frequently and remain in heat longer than the normal time; others fail to come in season except at intervals of six weeks to six months. In cases of fibrosis of the ovary the periods of estruation are usually very irregular. Many such cases show estrum only once or twice over a period of six to nine months.

THE USE OF HORMONES

Regarding both the glandular extracts and hormones having a stimulating effect upon the reproductive organs and those having a sedative action I can say that I have used them in a few instances with spectacular results. But in the use of glandular extracts, as in the case of drugs, one can never be absolutely positive that the product used was solely responsible for the results obtained. Glandular extracts should never be administered to a mare without first determining that the genital tract is free of infection.

Small, hard, fibrous ovaries, even to the point of atrophy, may occasionally be encountered. Treatment for these, if undertaken, would consist of massage and the use of those glandular extracts and products that have a stimulating effect. For tumors of the ovaries and an enlarged ovary due to fibrosis, removal is to be recommended if the size is not too great. In all mares with tumorous formation in the ovary, that have come under my observation, only one ovary was affected.

ABORTION

In the production of horses and mules the loss resulting from abortion is considerable for the country as a whole. In a given group of mares it may be very great. There are many different causes of abortion in mares. There are several specific types of infection, a number of nonspecific infections and noninfectious causes. These are listed and defined under eight separate headings.

1. Contagious equine abortion.—The cause is S. abortivo-equinus. This is a distinct and specific infection easy to recognize, having a number of rather characteristic features.

Abortion due to S. abortivo-equinus is diagnosed by positive cultures from the fetus, afterbirth and uterine secretions of the aborting mare and from a positive blood test. Most mares recover without treatment. In those that develop cervicitis and metritis the inflammatory changes are usually due to streptococcic infection, not to S. abortivo-equinus, as the abortion organism rarely remains in the genital tract. In bands of mares where this infection becomes established many abort, usually late in the period of gestation. All those that abort show infection and are positive to the blood test. Vaccination is an effective measure of prevention.

2. Virus abortion.—The cause is a filterable virus. The disease is highly contagious, occurring in enzoötic and epizoötic forms. While it is not known how the first mare in a group to abort becomes infected, it is known that the fetus, afterbirth and uterine discharges contain the virus. Thus, all aborting mares should be immediately isolated and the proper sanitary precautions taken in disposing of the fetus and afterbirth.

In virus abortion the onset is sudden without any premonitory symptoms. Only rarely is there retention of the afterbirth and the mare returns to normal quite as promptly as from a normal parturition. The fetus, fetal membrane and uterine secretions are bacteriologically negative. Blood tests are negative to S. abortivo-equinus. In bands of mares, usually many abort. The great majority do not show bacterial infection. The exceptions are that occasionally there may be a mare harboring streptococci in the uterus and fetus previous to the time of virus invasion. S. equirulis, the most common cause of navel- and

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joint-ill, may, in a small percentage of cases be found upon bacteriological examination of the aborted fetus. These and other bacterial infections that cause abortion and navel-ill, joint-ill and pyosepticemia of the newborn may be found in the genital tract of mares. While occasionally found in cases of virus abortion, they have no direct relation to that disease.

Pathologically, most of the aborted fetuses show multiple, small, grayish-white spots of degeneration in the liver, hemorrhages on the heart and often an excess of serous fluid in the thoracic and abdominal cavities.

Histologically, sections of the liver and lungs show intranuclear inclusion bodies. These inclusions are typically viral in nature.

3. Streptococcic abortion. — Abortion due to streptococcic infection is of a sporadic nature. The infection is either present in the uterus when the mare is bred or is introduced at the time of service.

The diagnosis depends upon isolation of streptococci from the fetus or structures of the afterbirth. The mare practically always shows the lesions of cervicitis and metritis. All bacteriological and serological tests are negative to S. abortivo-equinus. There are no lesions indicative of virus-abortion infection. Abortion may occur at any time during the period of gestation and there is no tendency or danger that the infection will spread to other mares.

4. Abortion due to infection of the genital tract of the mare and the fetus by one or more of a number of different microorganisms that may have accidentally gained entrance to the genital tract of the mare before or at the time of service.-Whatever infection may be present can usually be determined on bacteriological examination. In these less specific types of infection the mare usually shows evidence of inflammation of the genital tract. It is quite important to keep in mind the possibility of accidental contamination of the material examined and not mistake such accidents for actual infection. B. coli, staphylococcus, nonhemolytic streptococci, etc., are occasionally encountered. If recovered from tissues and organs under the conditions that exclude contamination and leave no doubt of intrauterine infection, it seems correct to conclude that the bacteria found were the cause of the abortion.

- 5. Shigella equirulis abortion.—Abortion due to infection of the uterus and fetus with Shigella equirulis, is rare in our experience as a cause of abortion. Sh. equirulis can by proper procedure be recovered from the fetus, afterbirth or uterine secretion.
- 6. Abortion due to the feed, to nutritional disturbances, to functional disturbances of the ovaries, such as might come from fibrocystic ovaries and failure of a corpus luteum to develop and function properly or to an endocrine imbalance are perhaps only rare possibilities. In some cases of abortion that have come under our observation there has been evidence indicating that some one or more of the above factors were directly or indirectly responsible.
- 7. Abortion due to a general debility of the mare or organic weakness and noninfectious structural changes of the uterus and genital tract.
- 8. Accidental abortions.—Injuries, strains from over-work and excitement and from service of stallion.

INFECTIONS OF THE NEWBORN FOAL

Streptococcic infection has already been mentioned as a cause of metritis and abortion in mares. Streptococcic infection in the newborn foal is usually, if not always

M. B. Starnes, popular public health veterinarian of Dallas, Texas.



prenatal in origin. The symptoms, lesions and distribution of the infection in foals that sicken and die from 1 to 15 days of age always indicate prenatal infection, while in foals from 15 to 30 or more days old, the history, symptoms, lesions and distribution of the infection may, in some cases, point back to prenatal infection and in others the evidence generally indicates a recent infection. This is particularly true of acute streptococcic septicemia in which navel and joint lesions are entirely absent. Since it is definitely established that streptococcic infection of the newborn is often a prenatal infection, preventive measures, to be effective, must be undertaken before the mare is bred and at the time of service,

rather than after the foal is born.

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Shigella equirulis.-This microörganism, formerly known as Bacterium viscosum equi, is the most common cause of navel-ill, joint-ill and pyosepticemia in foals. Of 590 foals subjected to bacteriological examination, 36 per cent revealed this infection, while only 25 per cent showed streptococcic infection. Unlike streptococci, it is not a genital infection in the nonpregnant mare and it only rarely causes abortion. From what evidence there is, it would seem that the infection has its origin in the digestive tract of the pregnant mare. Sh. equirulis is readily recovered from the tonsilar crypts of the great majority of horses of all ages in both sexes. Under favorable conditions the bacillus may gain entrance to the blood stream and be carried to the pregnant uterus. Here, it invades the tissues of the fetus where it remains more or less ineffective until the foal is born. Foals infected with Sh. equirulis may show symptoms at birth or within a few days. Sixty-five per cent of all foals from which this bacillus was isolated died from the 1st to 7th day of age. The most characteristic symptoms are lameness, general weakness and inability to stand or to nurse when supported. In very young foals, it produces the condition commonly spoken of as a "sleeper." In older foals, the first symptom is usually lameness, followed by an enlargement of one or more joints of the legs.

On autopsy, infected foals may not show gross lesions although the bacillus can be recovered from various tissues and organs. In foals that are 2 to 4 days of age and older, the gross lesions most often observed at the autopsy are multiple abscesses of the kidneys and purulent arthritis. In foals from 4 to 12 weeks of age that develop symptoms and later die from this infection. the predominating symptoms and lesions are arthritis with involvement of the tendon sheath. Chronic, localized lesions may be observed in the kidney. Sh. equirulis is often recovered from the verminous aneurysms of the mesenteric arteries. From foals that die from parasitic colitis and indigestion, the microorganism can often be isolated from the verminous aneurysms while other tissues and organs are negative.

In addition to streptococci and Sh. equirulis as infections of the newborn, B. coli, S. abortivo-equinus, Corynebacterium equi, staphylococci, nonhemolytic streptococci and other types of bacteria may occasionally be encountered. In some cases, the relationship of the microorganism isolated to the disease is quite evident, while in other cases it is not so directly apparent. The numerous types of bacteria that have been isolated from the tissues of young foals, together with the large number that are bacteriologically negative, indicate quite definitely how important bacteriological examinations are in helping to establish the cause of sickness and death in

In searching for a cause of death in young foals, 30 per cent of those cultured were bacteriologically negative. Among these are included cases of dystocia, traumatic injury, malformations and delayed parturition. However, after accounting for the above, the number of foals dead at birth and that die early in life from no apparent cause is sufficiently high to be of considerable economic importance.

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Foals are occasionally presented for autopsy that show extreme lesions of icterus. The common name for such cases is "yellow jaundice." Practically all are negative upon bacteriological examination. They

probably represent physiological and possibly nutritional upsets.

Many reports have been received from southern areas describing loss of foals early in life that show hemoglobinuria as the principal symptom and lesion. This is a condition not observed in foals in the area from which material making up this report comes. From the limited information available it seems apparent that these cases are not due to infectious causes. On the other hand, there is some basis for looking upon them as nutritional.

In many instances, a number of foals from the same group of mares have died at from 2 to 6 days of age. In none of these were bacteria found. The symptoms were diarrhea and depression with no rise of temperature. The organs and tissues were free of lesions except that the mucosa of the intestine was light in color with marked evidence of degeneration of the epithelial cells. In cases of this kind, consideration should be given to the possibility of a vitamin deficiency. The deficiency would be in the dam and thus in the milk. A pregnant animal may be extremely deficient in some essential nutritional substance and still produce live offspring. However, the young are often unable to survive because they are subnormal and the milk is deficient in one or more essential elements.

In about 40 per cent of cases of equine abortion and 20 to 25 per cent of foals examined, no evidence of infection was This percentage of cases of unknown origin is sufficiently high to warrant a further and more detailed search for the causes. Further investigation should take into consideration the possibility of virus infections and nutrition with special reference to vitamins. The history and nature of most cases that have been studied indicate, on the whole, a nutritional rather than an infectious cause. In a few instances, there was more evidence pointing to an infection than to a nutritional deficiency. However, in no case was the evidence supporting infection complete. Further work on abortion and diseases of the newborn would include the development of a product for the immunization of mares

against virus abortion, a method of dealing with *Sh. equirulis* infection of the newborn and a search for the cause of those abortions and the loss of foals for which, to date, no satisfactory explanation can be given.

PARASITES

A thesis of horse and mule production would not be complete without a brief reference to parasites. Many mature horses and mules harbor parasites in numbers that are injurious and frequently there are lesions and tissue changes in various parts of the body that had their origin from parasitic invasion earlier in life.

It is well known that there are forms of parasitism in horses and mules that are more serious in the young than in the adult. Foals become infested with parasites very early in life. Larval forms of the Strongylus vulgaris have been found in the mesenteric arteries of foals 1 month of age and according to some reports even earlier than this. Many sucklings and weanlings presented for autopsy show a heavy infection of parasites of the digestive tract. On autopsy, the main lesions are those of a severe colitis, submucous abscesses and purulent, verminous aneurysms. Injury to the mucous membrane of the intestine and migration through the tissues of larval forms favor bacterial infection.

There is no good way to deal with the bacterial infections which are often recognized as the immediate cause of death except to prevent the conditions that predispose to them. It is not worthwhile to take the time and incur the expense of produc-

Among those prominent in the educational field in the South is Wm. E. Cotton, famed for his brilliant work on brucellosis.



ing a healthy, live desirable type of foal and then neglect to protect it from the ravages of parasites and bacteria that often result in death or render the animal worthless. Regardless of how effective, efficient and inexpensive anthelmintics may be at present or how great an improvement there may be in the future, their use will probably never completely and satisfactorily be the final answer to parasitisms in domestic animals. On the other hand, prevention, with the use of anthelmintics, can be made effective. Proper correlation of prevention and treatment is the logical method of attack.

Brood mares should be kept reasonably free of parasites. The brood mare and the foal should be pastured on ground known to be free of viable, parasitic larvae. Certainly the mare and foal should not be turned out in a paddock or pasture that has been used for horses over a period of years.

The main problems to be considered in the production of horses and mules are first: health as related to the reproductive organs; second: breeding hygiene as related to service; third: heredity, by which is meant quality and kind of animals used for breeding purposes; fourth: nutrition with regards to feed of a quantity and kind that will furnish the essential nutritional substances; fifth: abortion; sixth: diseases of the newborn; and seventh: care and management.



Chas. C. Rife, outstanding veterinary practitioner of Georgia, who was recently elected member of the Board of Education of Atlanta.

The following tabulation is self-explanatory in showing the relative incidence of various bacterial infections in fetuses, foals and mares.

Bacteriological Examination of Fetuses to October 17, 1940

	Number of Cases	PER CENT
Negative	333	41.6
Negative (twins)	82	10.2
Epizootic abortion	201	25.1
Streptococcus	147	18.3
S. abortivo-equinus	19	2.4
Staphylococci	7	.9
E. coli	9	1.1
S. equirulis	3	.4
Total	801	100.0

Bacteriological Examination of Foals to October 17, 1940

	Number of Cases	PER CENT
Streptococcus	148	25.0
Sh. equirulis	213	36.1
E. coli	19	3.2
S. abortivo equinus	7	1.1
Corynebact. equi	11	1.9
Miscellaneous	15	2.5
Negative*	177	29.8
Total	590	99.6

^{*}Including traumatic injuries, dystocia and malformations.

Bacteriological Examination of Genital Tract of Mares to October 17, 1940

	Number of Cases	PER CENT
Negative	2760	66.47
Streptococcus	1065	25.65
Miscellaneous	107	2.57
Klebsiella pneumoniae (Friedlander's bacillus)	85	2.04
E. coli	74	1.78
Pyocyaneus .	39	.93
Salmonella abortivo-equinus (Equine contagious abortion)	15	,36
S. equirulis (Viscosum equi)	5	.12
Corynebacterium equi	2	,05
Total	4152	99.97

Infectious Equine Encephalomyelitis in the United States in 1940*

JOHN R. MOHLER, V.M.D., A.M., Sc.D.

Washington, D. C.

THE FOLLOWING report is submitted in continuation of the project of collecting and disseminating field data on equine encephalomyelitis.

The summary given is compiled from information supplied coöperatively to the Bureau by state livestock sanitary officials, state experiment stations, state extension veterinarians, county agricultural agents, and Bureau inspectors in charge, to whom appreciation is extended.

GENERAL OBSERVATIONS

From table I it will be observed that 16,941 cases of the disease, resulting in 4,187 deaths (about 25 per cent mortality), were reported from 38 states. Over 96 per cent of the cases were reported from 22 states west of the Mississippi River, less than 4 per cent occurring in 16 states east of the River.

The general incidence of the disease is calculated to have been 2.58 cases per 1,000 horses and mules in affected areas. Considerable increases in incidence over 1939 were reported in the Pacific Coast States, Idaho, Nevada, New Mexico, North Dakota, South Dakota, Kansas, Iowa and Oklahoma. Extremely high incidence occurred in a few localities in some of these states.

Again, a relatively small number of cases were reported as early as January and February from states then still experiencing freezing weather. Without laboratory confirmation, such diagnoses must remain open to question, according to present knowledge,

An effort has been made to encourage the various state agencies to undertake special study of such cases, as well as those occurring during the generally accepted encephalomyelitis season, which usually extends from June to October, for the purpose of isolating and typing the virus.

*From the Bureau of Animal Industry, U. S. De-

partment of Agriculture.

VACCINATION

Reports of the actual vaccination of only 257,943 animals were received, although from the information at hand it is estimated that probably 1,000,000 received such prophylactic treatment. Considerable, though not great, numbers were reported to have suffered more or less local or general reactions following vaccination, and some deaths attributed to vaccination resulted, as in 1939.

The Bureau's studies¹ led to the almost universal adoption of intradermic vaccination later in the season. No reports of untoward reactions or deaths following this method of vaccination have as yet been received.

That vaccination is not infallible is indicated by the fact that 129 animals were reported to have developed encephalomyelitis after the lapse of a supposedly sufficient time for immunity to have developed. The somewhat indefinite information on the disease in vaccinated animals from some reporters emphasizes the desirability of continued observation of treated animals and special examination in suspected instances of failure of vaccination to protect against the disease.

Intradermic vaccination, while not a difficult matter for the veterinarian, is a technical procedure which should not be undertaken by untrained laymen. The general application of vaccine by veterinarians should lead to more explicit and detailed information on the extent and merit of the technic, and vaccination in general.

RECENT DEVELOPMENTS

In 1940, Kitselman and Grundmann² reported the demonstration of virus in assassin bugs (*Triatoma sanguisuga*) collected in Kansas. While the distribution and bio-

¹Vet. Med., xxv (1940), pp. 377-388.

Tech. Bul. 50, Kansas Agr. Exp. Sta. (1940).

TABLE I-Summary of Reports on Incidence and Mortality

	Horses and		Cases		DEATHS		ORT OF
STATE	MULES IN AFFECTED AREAS	Animals Affected	PER 1,000 HORSES AND MULES	TOTAL DEATHS	PER 100 AFFECTED ANIMALS	FIRST CASE	LAST CASE
Alabama	22,580 (1)	22	1.0	12	55	April	Sept.
Arizona	29,518 (1)	12	0.4	4	33	June	Sept.
Arkansas	49,304 (1)	223 (3)		50			
California	209,800 (2)	732	3.5	242	33	Feb.	Oct.
Colorado	160,822 (2)	326	2.0	109	33	May	Oct.
Florida	22,308 (2)	176	8.0	154	88	May	Sept.
Georgia	3,637 (2)	1	0.3	1	100	August	Augus
Idaho	68,000 (2)	564	8.0	74	13	May	Sept.
Illinois	513,665 (1)	195	0.4	78	40	Feb.	Oct.
Indiana	33,190 (1)	7	0.2	4	57	June	Oct.
Iowa	738,587 (1)	1,097	1.5	259	24	April	Nov.
Kansas	444,299 (1)	1,735	4.0	262	15	May	Oct.
Kentucky	5,675 (1)	3	0.5	2	66	Sept.	Oct.
Louisiana	21,413 (1)	8	0.4	4	50	May	July
Maryland	5,676 (1)	3	0.5	2	66	July	Oct.
Massachusetts	12,920 (2)	8	0.6	4	50	June	Sept.
Minnesota	522,000 (2)	410	0.8	101	25	April	Oct.
Mississippi	25,309 (1)	26	1.0	24	92	April	Nov.
Missouri	643,680 (2)	2,750	4.3	701	25	July	Nov.
Montana	99,007 (1)	93	0.9	4	4	May	Oct.
Nebraska	348,525 (2)	1,003	3.0	279	28	Jan.	Nov.
Nevada	13,556 (2)	128	9.0	37	29	May	Oct.
New Mexico	45,044 (2)	423	9.4	62	15	June	Oct.
New York		420	0.3				Oct.
North Carolina	13,365 (1)	23	0.5	22	96	July	Sept.
North Carolina North Dakota	43,113 (2)	1,157	5.0	255	22	June	Oct.
Ohio	212,174 (2)	1,137	0.3	200	50	June	Oct.
Ohio Oklahoma	7,532 (1) 599,161 (1)	_	5.0	631	20	July	Nov.
		3,115 261	3.0	87	33	May	Oct.
Oregon Rhode Island	80,595 (1)	3	4.0	3	100	July	July
	788 (2)		2.0		27	May	Oct.
South Dakota	272,200 (2)	605		165	34	June	Nov.
Texas	727,055 (1)	753 .	1.0	253			
Utah	27,839 (1)	83	3.0	45	54	July	Sept.
Vermont	3,346 (2)	3	0.9	2	66	May	July
Virginia	957 (2)	3	3.0	3	100	Sept.	Sept.
Washington	113,139 (1)	726	6.4	174	24	March	Oct.
Wisconsin	325,800 (2)	161	0.5	54	34	May	Nov.
Wyoming	95,241 (2)	97	1.0	23	24	June	Nov.
Total or Average	6,560,820	16,941	2.58	4,187	25		

¹Figures taken from U. S. Census of Agriculture, 1935, U. S. Department of Commerce, Bureau of Census

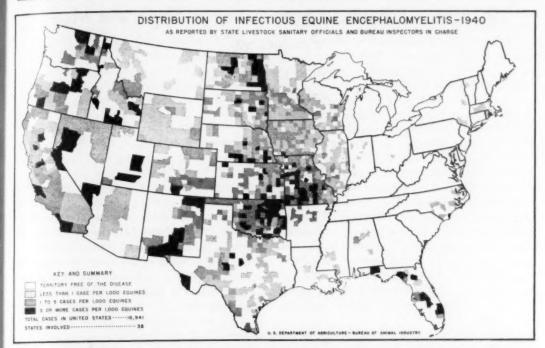
²Figures submitted by reporters.

³Estimated on basis of deaths reported and incidence and mortality in adjoining states.

nomics of the species indicate that it is probably not the chief vector of the disease among Equidae, the finding may prove significant as an indicator of possible reservoirs for the virus among the many species which may be attacked by the bug.

The fact remains that virus has never before been demonstrated in any insects collected in the field, although the disease has been readily transmitted experimentally by no less than ten species of mosquitoes (all of the genus Aedes) and by the Rocky Mountain spotted fever tick (Dermacentor andersoni).

The search for a natural reservoir of the disease outside the equine family must be continued before the many problems involving the epizoötics can be solved. Except for horses, mules and man, none of the 20 or more species of mammals known to be susceptible under artificial conditions has been found infected in nature. Of a like number of species of birds known to be susceptible to intentional inoculation,



only two, pigeons and pheasants, have been found infected under natural conditions. In a few instances, blood from hens and turkeys has been found to neutralize eastern type virus, and the birds have been presumed to have acquired the infection at some time in an epizoötic area.

It is believed that infectious equine encephalomyelitis is a major problem in profitable American agriculture, to the study of which every possible effort should be directed. The isolation and typing of strains of the virus are important, not only from the standpoint of diagnosis, but for the proper control of vaccination procedures as well. Actually, relatively very few strains of virus have been recovered and typed, and in many sections diagnoses have been based solely on clinical evidence.

Horse and Mule Association Inaugurates a Big Idea

Having been so informed on several occasions, readers of the Journal need not be told that the struggle with surplus farm products arose to a great extent through the farming of the acres once needed to furnish horse feed. Otherwise stated, the amount of land freed on account of a diminished use of horses is about equal to land now causing the overproduction of farm crops. To remedy the situation, the Horse and Mule Association of America proposes to have the Soil Conservation Act or the Agricultural Adjustment Act amended in such a way that farmers will be rewarded by farming with horses and mules to the extent of two acres of their allotment for

soil depletion per horse or mule, or per each two colts.

There is little, of course, the veterinary profession can do to further this movement. The demand will have to come from the horse-using farmers.

Crop Land

There are 415 million acres of cropland in the United States. Of these but 342 million are classed as "good." The remainder is too steep, too rough, too shallow or too infertile for profitable cultivation. Actually there are now in crops but 62 million acres that are both good and safe from erosion. Erosion has ruined or impoverished 282 million acres.—Soil Conservation Service, USDA.

Problems of Artificial Insemination in Horse and Mule Production*

VICTOR R. BERLINER, Ph.D.+

State College, Miss.

ARTIFICIAL insemination can be a valuable help to those engaged in horse and mule breeding. At the present time it is not as much a means of overcoming sterility as it is an auxiliary to subdue difficulties in breeding that are caused by physiological characteristics of the reproductive functions of horses: It is a peculiar arrangement of nature that, coupled with the mare's long heat period and an uncertain time of ovulation, is a very low viability and longevity of the horse's semen in comparison to that in other species such as cattle and sheep.

About fifty years ago when artificial insemination had its beginning in practical livestock breeding, these facts were not known, and artificial insemination was used in an attempt to overcome sterility of mares: as first practiced by the French veterinarian Repike, semen was collected from the vagina of a bred mare and reinjected with a syringe into the cervix of the same mare. This method was justified in some cases because a mare in which the major part of the semen is deposited into the vagina, very likely will not become pregnant because in natural service the semen is not deposited into the vagina but is pressed directly into the uterus; and because the semen left in the vagina perishes before it possibly could enter the cervix. The vagina is a very unfavorable environment for semen. This faulty deposition can be caused by anatomical abnormalities, such as a wrong position of the cervix, lack of relaxation of the cervix at time of service. and premature dismounting of the stud. In such instances a reinsemination of the

same mare into the uterus is very apt to bring about pregnancy.

COLLECTING SEMEN

The collection of semen from the vagina is not suitable for the purpose of breeding several mares with fractions of one ejaculate. It is true that at the start of the artificial insemination era this system was used, and in spite of its many faults, with surprisingly good results. The bad points of collecting the semen from the vagina or uterus, either by aspiration or with a sponge, are quite clear. In the first place, if the semen was properly ejaculated into the uterus, it is sometimes impossible to obtain enough sperm-containing semen. In the second place, the semen collected in this manner is of lowered quality because it is diluted with secretions of the uterus or vagina that have a harmful effect on the longevity of the sperm. Third and chiefly, it is definitely objectionable from the standpoint of breeding hygiene and sanitation. There is always danger that contamination will spread disease to the other mares bred with the polluted semen.

The difficulties of semen collection are overcome now by the use of artificial vaginas. The first ones were developed in Russia, and later in England. In America we made our contribution to this work by constructing a "Mississippi" model, made entirely of rubber, that is easy to handle and works very satisfactorily in every respect. Its construction was already described elsewhere.1

HEAT AND OVULATION NOT SIMULTANEOUS

Theoretically, it should be possible to use the semen to inseminate a large number of

*Contribution from the Department of Animal

Husbandry, Mississippi Agricultural Experiment Station, paper No. 36, new series. Presented at the annual meeting of the Southern Veterinary Medical November 13-15, Association, Birmingham, Ala. 1940. †Associate professor of animal and dairy husbandry, Mississippi State College.

¹Berliner, V. R.: An Improved Artificial Vagina for the Collection of Stallion and Jack Semen. J.A.V.M.A., xcvi (1940), p. 667.

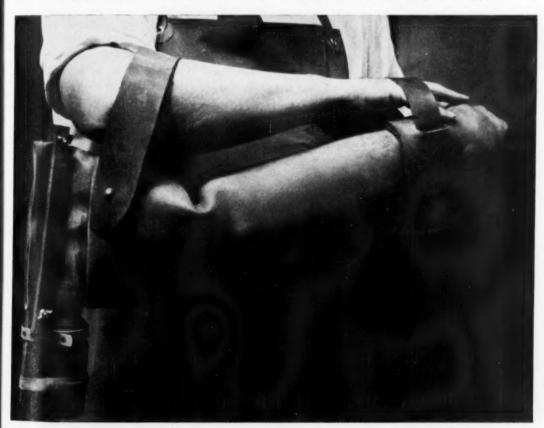
mares by a particularly desirable jack or stallion as is done by the artificial insemination societies for dairy cattle, whereby the semen is carried to cows in heat. Many cows are settled in this manner with a single insemination because cows have a short heat period and the sperm lives long enough to fertilize the ovum.

Unfortunately in horse breeding it does not work out so well, at least for the time being. As mentioned above, the mare ovulates at an unpredictable time during her heat period, and if she is bred, artificially or naturally, at a time that is too far off the time of ovulation, she will not become pregnant if the interval between insemination and ovulation is longer than the survival period of stallion or jack semen in the genital tract of the mare. Also, if a mare is bred too late in her heat period, she will not settle because the sperms do not reach

the Fallopian tubes in sufficiently large numbers at the right time to be present when the ovum descends into them. The indications are that generally stallion sperm will survive only around 30 hours in the mare, but there are some individual variations depending upon the quality of the semen. Some jacks and stallions have better and stronger semen than others. At least we know that with storage in vitro. there exists a great variation between semen samples in regard to length of the survival period. The causes for this are such factors as breed differences in sperm viability, feeding of the stallions, season of the year, and finally the handling of the semen before insemination or storage.

HANDLING SEMEN

The handling and treating of semen has become a new branch of physiology, and the



-From J. A. V. M. A., May 1940

New type of the artificial vagina for jacks and stallions (Mississippi model) that can be cleaned and starilized easily.

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findings in this field have made possible the progress of artificial insemination of farm animals. It is known now that semen has an energy metabolism that is similar to that of the yeast or muscle cell: The sperm have both, anaerobic metabolism, using carbohydrates (glycogen and glucose) as sources of energy, resulting in an accumulation of lactic acid in the semen. and an aerobic metabolism, with CO, as the end-product. In the semen of ruminants, this metabolism is very rapid, due to its very high sperm concentration and high amount of glucose and glycogen. As a consequence, the semen becomes rapidly acid, and as acidity increases, metabolism and motility of the sperm is slowed down: The sperms go into a reversible resting stage, anabiosis. Anabiosis can be brought about also through a cooling resembling hibernation. On rewarming and the addition of buffers they again become motile. Of course, there is a limit to this process; after prolonged storage the sperm dies through aging.

This anabiosis of ruminant sperm that is so favorable for storage can not be produced as effectively in the semen of stallions and jacks. Their semen contains far less sugars; their sperm concentration is considerably lower than in the ruminants (20 to 60 million per cubic centimeter in draft stallions; 100 to 300 million in warm blooded stallions; 100 to 500 million in jacks vs. 0.8 to 2 billion in bull semen, and 1 to 6 billion in rams) because this semen contains large amounts of seminal fluid coming from the accessories. This accounts not only for the low sperm concentration but it changes also the chemical picture. These fluids contain a high concentration of bases giving the semen a neutral or even alkaline reaction. For this reason the production of acids is too low and slow to cause anabiosis. As a fact stallion semen was found to become alkaline on standing, because a very pronounced protein metabolism yields ammonia that counteracts the onset of anabiosis. As a consequence stallion sperms do not go to rest but swim around until exhausted. To make matters

still worse, the electrolytes irritate the electric charge carried by the individual sperm, stimulating motility, but at the same time destroying finally the protective lipoid capsule around the sperm head because the capsule of stallion sperm is considerably weaker than that of the sperm of ruminants.²

Various methods were tried to remedy these unfavorable conditions. In principle. all methods were based on changing the environmental medium of the spermatozoa by adding certain ingredients that would make the seminal fluid less harmful, and at the same time make the sperm itself more resistant to destruction of its structure by strengthening the protective capsule against the influence of the electrolytes. This led to the development of the artificial media now known as semen dilutors. Most of these dilutors were worked out by Russian workers. They have rendered good services in the hands of most workers. A slightly different approach was first suggested by Russian workers and then modified by Walton,3 and later by McKenzie.4 It consisted of removing the seminal fluid by centrifuging followed by a suspension of the precipitated sperm mass in a suitable dilutor. For prolonged storage of draft stallion semen, this method worked quite satisfactorily. But McKenzie found that addition of the centrifuged seminal fluid to the stored concentrated and diluted sperm mass before insemination gave better pregnancy results than with semen without addition of the original seminal fluid. This demonstrated that the seminal fluid does contain some, yet unidentified, ingredients that help in fertilization, though they are antagonistic to storage.

In our own work we use the Russian glucose-tartrate dilutors that are made up of: glucose, working as nutrient and promotor of anabiosis; KNa-tartrate (Rochelle salt) for its buffer and anabiotic action; and pep-

^{*}Shergin, N. P.: Energetics of Spermatozoa in the Problem of Semen Preservation. Prob. An. Husb. No. 9 (1936), pp. 124-149. (In Russian.)

Walton, A.: Preservation of Fertilizing Capacity of Horse Semen. Proc. Am. Soc. An. Prod. (1938),

⁴McKenzie, F. F., Lasley, J. F. and Phillips, R. W.: The Storage of Horse and Swine Semen. Proc. Am. Soc. An. Prod. (1939), p. 222.

tone as a sperm capsule protector.8 Tannin and tartaric acid in small amounts are added in some dilutors to assist in these actions. The detailed composition of these dilutors is given in the accompanying table.

TABLE I-In Grams per 100 cc. of Water

	GLU- COSE	KNa- TAR- TRATE	TAR- TARIC ACID	TAN- NIN	PEP-
T-G-L T-G-L-5 T-G-L-6	5.76 6.48 6.85	0.67 0.33 0.15	0.01 0.008	0.002	0.2

Since a jack's ejaculate and that of warm blooded stallions is small in volume, dilution serves a double purpose: as preservative by improving the conditions for survival of the sperm, and to enlarge the volume of the ejaculate. The degree of dilution is regulated by certain factors. We have found that the longest survival periods at storage are obtained with a dilution not over 1:4. For immediate insemination, one can go to as high as a 10-fold dilution, provided the original sperm concentration was high enough to permit such a high dilution. Basing on observations of other workers, we attempt to give each insemination dose a volume of 20 cc. containing approximately 2 billion sperms. With too high dilution, the sperm number gets too low. There enter also some biochemical factors that result in a clumping and agglutination of the sperm heads. It is quite obvious that this interferes with their motility and viability. Perhaps here also the concentration of the ingredients that were claimed by McKenzie to be present in the seminal fluid and that promote impregnation, becomes too low. We were able to produce colts with semen that was stored for over 24 hours. We have reported on this production of "cold storage colts" elsewhere. The most significant observation on this work was this: The sperm on being reheated after storage at 40 to 50°F, loses its surviving capacity at body temperature the faster, the longer it was stored previous to reheating, which to a certain extent can be considered as comparable to its survival in the mare's reproductive tract.

STIMULATING OVULATION

The significance of this is obvious: One should remember that the sperm may have to wait in the tubes for a considerable time before the ovum is liberated and descends into the tubes. Attempts were made to overcome this obstacle not only by increasing the survival capacity of the sperm, but also from the mares' side, by regulating artificially the onset of ovulation. It is generally recognized that ovulation in the mare does not depend upon the act of copulation, but is brought about spontaneously by an interaction of the gonadotropic hormones of the pituitary. For the time being, one can say that it is possible to stimulate ovulation but the variation in the time interval between injection of the hormones and the induced ovulation is still rather great; also the hormone preparations that are available at the present are not sufficiently uniform. They do not work at all in some instances. Experiments are also under way at the Mississippi station, and elsewhere to bring on heat and ovulation in mares that are "shy" breeders. The prospects here too are very promising but again this phase has not yet advanced far enough to be advisable for routine work. I have no doubt that coöperative work will finally achieve this goal and then the use of artificial insemination will become a still better means for safer horse production.

For in spite of the opinion occasionally encountered that with artificial introduction of semen into the mare, one does not depend on the heat period and that semen introduced in this manner will survive un-

⁵Milovanov, V. K.: Artificial Insemination of Farm Animals. Selchozgiz. (1936), p. 111.

⁶Berliner, V. R., Cowart, F. E., and Pharis, L. L.: The Effect of Feed on Sperm Production of Jacks and Stallions, and Some Physiological Properties of Their Semen. Proc. Am. Soc. An. Prod. (1939), p. 225.

⁷Berliner, V. R., Cowart, F. E., and Pharis, L. L.: Cold Storage Colts. J. Heredity (1940), p. 449.

^{*}Milovanov, V. K., Lichacev, A. N., and Zevanova, T. A.: Preservation of the Fertilizing Ability of Stallion Sperm by Artificial Anabiosis. Sov. Zootechn. iv (1939), p. 31. Abstr. in An. Breed. Abstr., Edinburgh, viii, No. 2 (1940), p. 110.

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til the next ovulation whenever it may occur, it is proven beyond doubt that this is an erroneous belief and that even with artificial insemination one has to inseminate during heat and close to ovulation.

Until means are developed to regulate safely the time of ovulation, we have to eliminate the risk of the excessive time interval between insemination and ovulation by frequently introducing fresh semen into the mare during heat. We do this in our routine work by breeding the mare every other day so that a fresh semen supply is in the tubes whenever she may ovulate. With natural breeding alone, this system would involve a tremendous load on the jack or stallion. With artificial insemination on the other hand it is possible to breed many mares at frequent intervals with only a few actual services by the studs.

Our station animals do not give more than three or four services per week, and we use only the artificial vagina for collection, using either a hobbled mare or a dummy to collect with. I have not found a stud or jack yet that refused to work in an artificial vagina. They can be trained easily to perform satisfactorily.

CONCLUSION

In conclusion one can say that with the better understanding of more physiological phases involved, artificial insemination of mares helps to make horse and mule production a safer and, thereby, more profitable enterprise, provided it is handled carefully. This breeding method also can be an important factor in a sanitation program in districts where numerous mares are affected with diseases of the genital organs that are transmitted through copulation from one mare to the stallion or jack, and passed on to other mares. By excluding this contact between mare and stud, the danger of spreading of such diseases can be minimized, but in order to achieve this, it is essential that the operator is familiar not only with the technic of artificial insemination but also with its dangers as a disease spreader when handled in a negligent manner.

DISCUSSION

Dr. Blacksburg.—Have you done any sex control work?

Dr. Berliner.-Not directly; but we made observation if and how the used dilutor with a pH of about 6.0 would affect the sex ratio. According to the advanced theories, an acidified semen should produce a predominance of females. Well, among the horse and mule colts we had a ratio of two males to one female, but in the jennets the sex control was complete since all colts were females! Now I think that this was a chance result, but I believe that we will get somewhere, if this theory is based on sound principles. At Wisconsin they are doing considerable work in this field. Reports on their results are scheduled for the Chicago meetings of the Society of Animal Production.

Dr. Anderes.—What about or what is the average ovulation time in the heat periods?

Dr. Berliner—The mare stays in heat for about 48 hours longer after she ovulates. But you can not predict when ovulation is going to occur since there is no correlation between onset of heat and time of ovulation. This is the reason why we advocate breeding several times during each heat period. Usually the mucus discharged from the vagina becomes very thin and liquid and plentiful just before ovulation. This is a fairly good sign for the stage of heat and the right time for breeding.

Dr. Frederick.—Will the same mare stay in heat for the same time at different periods?

Dr. Berliner.—In early spring before the pasture gets good many mares stay in heat very long, sometimes even continuously. As the season progresses and the mares get in better condition, the heat periods become shorter. We consider a heat period of four to six days duration as most favorable and normal.

A carefully conducted study of the human riboflavin requirement by Sherril, Butler, Wooley and Isbell of the U. S. Public Health Service (Public Health Reports, March 11, 1941) showed that a daily intake of 3 mg. is sufficient for an adult.

A process for making artificial wool from peanut meal has been patented.—Science News Letter.

Great advances have been made in the understanding of prehistoric life by recent studies of the lost Incan cities of Peru.

SURGERY & OBSTETRICS

AND PROBLEMS OF BREEDING

A New Departure in Horseshoeing: Tube Borium

WE ARE INDEBTED to J. N. Frost of the New York State Veterinary College and to J. L. Tyler of Whittier, Calif., for definite information pertaining to a non-slip shoe for horses which, needless to emphasize, is a matter of paramount importance at the present time. The fact that there are now about 46,000 animals with our troops and about 8,000 more ready to issue together

with orders for 6,000 more under way brings the art of horseshoeing into the foreground of the national defense program.

Moreover, horses on parade, like military mounts, can not choose their footing, and whatever may be the condition of street, highway or terrain, animals must carry on, often, with ordinary shoeing, under difficulties that practically unhorse a mounted service of peace or war.

Having received numerous newspaper clippings quoting Dr. Frost as advocating the use of the new shoe, we wrote him for details and received the following reply:

TO THE EDITOR:

The clipping you sent me somewhat overstates the case. We have been using borium on horseshoes and have found that it does a very good job. I think the army has been experimenting with this material for some time as I saw a reference to it in one of the army journals about a year ago.

The difficulty with borium is that it is too hard to weld with ordinary blacksmith fire and, therefore, has to be put on with either an electric or acetylene torch. It does prolong the

life of the shoe and stands up very well under wear.

At the present time I have a saddle horse that has been standing on concrete and has had but one set of these shoes in four months. While the shoes have been reset, the borium has not been touched and is still sharp enough so that the horse does not slip either on ice or frozen black-top. I believe it is well worth the trouble of applying it to shoes.

You can probably get further information

from the Stoody Company, Whittier, Calif., who make the product and who have the necessary information regarding the size and cost of the material.

Very truly yours,

J. N. FROST

New York State Veterinary College at Cornell University.

March 12, 1941

Whereupon, the Journal requested J. L. Tyler to investigate the details mentioned by Dr. Frost, and received the following reply:



Horseshoe surfaced with borium.

TO THE EDITOR:

On receipt of your letter regarding hard-faced horseshoes I am pleased to state that I at once took this matter up and have been able to collect considerable information about this shoe. I am enclosing some personal statements on the subject and under separate cover shall send you some literature the makers publish. I congratulate you for bringing this important matter to the attention of those interested in it.

Very truly yours, J. L. TYLER, Whittier, Calif.

April 3, 1941

Dr. Tyler's investigation brought all of the essential information desired by the

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readers of the JOURNAL, who will thank him for the trouble taken and also the Stoody Company for the courtesy shown him when he visited their plant in Whittier. Illustrations from the circular sent by Dr. Tyler are shown herewith, and a letter from a user for six years, addressed to him, reads:

Dr. John L. Tyler, Whittier, Calif. Dear Dr. Tyler:

In regard to your request for my personal opinion of the use of borium as applied to horseshoes, I have used this method on all of my horseshoes for approximately six years and have found it highly satisfactory.

I have been a member of the sheriff's posse for a number of years and this organization gation. The letter is significant in dispelling the idea that treating shoes with borium lies beyond the skill of the practical horseshoer. The letter reads:

Dr. John L. Tyler, Whittier, Calif. Dear Doctor Tyler:

In accordance with our recent conversation we are listing below the pertinent facts regarding the application of tube borium to horseshoes.

The application is made by the acetylene method and to our knowledge no difficulty has ever been encountered by any half-way qualified welder. The points of application, we believe, are well illustrated in the folder you took home with you. The application itself is de-





The shoe to be surfaced with tube borium is first shaped to the horse's hoof. Borium is then applied to the shoe by the oxyacetylene welding process.

equips all of its horses with shoes that have been treated with borium 100 per cent.

During several years I have had occasion to ride in many parades on all sorts of conditions of highways and during the course of these parades I have noticed that other horses not so shod have slipped on the roads. I have yet to see a horse fall that was shod with borium-treated shoes.

My experience is that borium-treated shoes last approximately two years and give highly satisfactory service for that length of time.

If there is any other information which I may be able to secure for you, please do not hesitate to call on me.

Very truly yours,
Wilber J. Cox,
Cox-McAllister Motor Co.,
Whittier, Calif.

April 2, 1941

In regard to prices and other things, the Stoody Company wrote Dr. Tyler the following letter after his interviews and investiscribed and illustrated in sufficient detail to secure satisfactory results. The outcome of many tests and of years of experience has proved that the application of 1/4", 8-10 acetylene tube borium gives results that can not be equaled by any other product.

Based on the present price of tube borium and of facing a set of riding shoes, the application can be broken down as follows.

		etylene t		\$0.76
Acetyle	ne and o	xygen		03
Welder.	10 minu	ites at \$1	.25 an h	our

Considering the extra life and extra security obtained, the cost of \$1.00 per set of shoes is minor indeed. Actually it is as cheap or cheaper to maintain a horse with borium-applied shoes than it is to maintain the same horse in shoes which have not been so hard-faced.

It was a pleasure to show you through our

organization and we wish to offer our future cooperation.

Very truly yours, STOODY COMPANY J. R. Spence Industrial Sales and Research Manager

Whittier, Calif. April 2, 1941

Judging from the facts mentioned herein, a perturbing problem of horsemanship throughout the centuries has been successfully solved by the art of modern welding



The finished shoe is nailed to the hoof in the usual manner.

and the use of a hard metal that should/may supersede the old toe clip and heel calk and the various types of rubber-enforced shoes that did not last long enough to serve their purpose.

Certainly, the most colorful mounted organization in this country is the sheriff's posse of Los Angeles county, Calif., which the millions who have watched the Tournament of Roses parade of each New Year's Day in Pasadena will recall. This picturesque troop, maintained to perpetuate the traditions of early California, has on its roster such famous names as Tom Mix, Reb Russell, Buck Jones, Chuck Morrison and other well-known horsemen. The commanding officer is Eugene Biscailuz, sheriff of the county for 35 years, who, after the parade of 1937, wrote: ".... Riding at the head of the posse, I agree with the members that since treating the shoes with borium, not only the riders, but also the horses feel the safety of each step parading on slick wet pavements and steel car tracks."

This testimony is a classic on the subject. "Not only the riders but also the horses feel the safety of each step" could have been written only by the expert rider of spirited horses on all kinds of footing.

WHAT IS BORIUM?

"Borium" must not be confused with the nonmetallic element "boron," the Latin name of which is borium. Borium is the trade name of a fused tungsten carbide developed in 1927 to replace black diamond for rotary drilling tools. Borium-treated bits resist the hardest of earth formations and they do not wear round like bits treated with other hard substances. They keep sharp by chipping and thereby maintain their keen-cutting face until completely worn out. The chipping is the property that qualifies borium for fusing into the wearing surface of the horseshoe. It stays sharp—non-slip.

Tube borium is a heterogeneous substance composed of tungsten carbide and steel, made up for use in the form of rods. The tungsten particles in the steel matrix are so hard that the rod can not be tested for hardness by the standard methods.

Horseshoers are reminded that tube borium is of two kinds: one for acetylene and one for electric welding. The two are not interchangeable.

Traumatic Dislocation (Rotation) of the Os Pedis

A big, young gelding, one of the pair engaged in the pulling contest during farmer's week at Lansing (Mich.), developed a lesion of the sole between the point of the frog and the toe. There is a bulging slightly larger than a quarter that oozes around the base when pressed upon. He was brought in 18 miles to my hospital on a truck. Having found such conditions unsatisfactory to treat, I would be pleased to know how the case should be handled.—

A. B. Sexsmith, M.D.C., Charlotte, Mich.

[The injury is equivalent to chronic dropping of the sole following acute founder (laminitis). It was caused by the tremendous pull of the perforans on the os pedis, the fulcrum of the powerful muscles of traction. In fact, most all of the force

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exerted in pulling centers upon this bone through its attachment to the plantar aponeurosis. In horse-pulling contests it is remarkable that this accident is not more common. In the course of practice among draft horses we have seen this accident occasionally in horses that have tugged in vain against a stalled load. In watching horses straining at a dynamomometer many experienced veterinarians have wondered why the mechanism of traction has not more often given way at this point.

This horse is doomed as a contestant in pulling exhibitions since repositioning of the displaced bone will never be complete, and unless carefully managed, he may not even become a useful draft horse for ordinary work.

Forcing the horse to bear weight at the toe by shoeing with high heel calks is necessary, notwithstanding that it may be painful. The object is to relax the perforans at this point and thus gradually allow the bone to swing back to its proper place. Such an animal will try to bear most of the weight at the heel and thus perpetuate the displacement. Preventing infection by the use of protective antiseptic dressings is also essential.]

A Successful Nephrectomy

The subject was a 9-year-old mongrel terrier bitch, weighing 17 lb. She had been sick three weeks. The mucous membranes were pale, temperature normal, body emaciated, appetite nil, and urine faintly odorous. A growth running forward from the kidney, seemingly attached to the liver, could be traced by deep abdominal palpation.

OPERATION EXPLORATORY

The exploratory laparotomy performed under nembutal anesthesia disclosed that the true nature of the trouble was a nephroma, 6 in. long and about 12 in. in circumference, whose anterior extremity was attached to the posterior face of the liver. When removed the growth was found to weigh $2\frac{1}{2}$ lb. The hepatic adhesion which



O. G. Button (left) and R. A. Button with Irish Terrier mongrel from which they extirpated a tumefied kidney weighing over 3 lb.

had to be broken down was 2 in. in diameter.

The patient ate the following morning and proceeded to make an uneventful recovery, although not sufficient time has elapsed to determine the final result.—
R. A. and O. G. Button, Tacoma, Wash.

Hepatic Sarcoma—Ascites

Ascitic fluid amounting to 2,736 oz. was drawn from a 10-year-old Boston Terrier from January 27, 1940, to January 29, 1941. The abdomen was tapped more than once a week during that period, or 57 times. The average amount of fluid withdrawn was 48 oz. per operation. The interrupted splanchnic circulation responsible for this copious transperitoneal filtration was caused by a sarcomatous liver.—Edwin Laitinen, B.V.Sc., West Hartford, Conn.

Comes a belated report that Harry E. Hansen, Ballston, N. Y. removed a \$550.00 finger ring from the stomach of a dog as part of a day's work in his hospital last November. *Modus operandi* not given.

Correction

In the article entitled "Do Elephants Breed in Captivity?" published in the April 1941 issue of the Journal, the figures "345" on page 310, column 2, paragraph 2, line 1, should read "545."

Bovine Surgery*

GEO. R. FOWLER, D.V.M.+

Ames, Iowa

BECAUSE of the limited time, this paper will be confined to surgery of the udder and teats, the most interesting, the most common, and the most difficult phase of bovine surgery.

Before mentioning specific technics, it will be worth while to consider some of the general principles that make surgery of these parts so difficult from the viewpoint of a successful end result. In the first place, the dairy cow is an artificial product of civilization. Man has taken her and in a few generations has developed an animal that produces many times the milk that her primitive ancestor did. The lactation period has been lengthened from the few weeks of Nature's cow to almost a year or even longer. The milk secreted in the udder is now removed by hand or machine in a manner which little resembles the normal suckling of the calf, and then is removed usually twice or at best four times daily instead of every few minutes as was done by the calf. This produces a distention of the udder and a disturbance of its circulation not experienced by the natural cow. This distention frequently results in relaxation of the sphincter of the teat that allows milk to pass out in drops and sometimes in a stream. This may lead to the entrance of infections into the interior of the teat. The increased size of the udder brings it closer to the ground where it is exposed to traumas of all kinds. The original cow roamed over large areas, lying on clean ground, while the dairy cow is kept in stables, small barnyards, or at best in small pastures, usually reeking with accumulated filth and infection from many years. The primitive cow also balanced her own ration, eating many kinds of plants from many kinds of soil over wide regions. The modern dairy cow is fed what

we think she should have, and there is grave doubt that our knowledge and practice of nutrition is as efficient as it should be. There is always the possibility that the physiological reserves of necessary and vital substances in the body of the cow have already been reduced to a minimum and any additional burden placed upon the animal by infection or either accidental or surgical trauma may be more than she can bear.

The udder tissue of the dairy cow has little resistance to infection. This means that we must operate under perfect asepsis or run the risk of ending up with a worse condition than at the beginning. Mastitis with loss of a quarter or even the life of the cow may follow the introduction of infection by an imperfect aseptic technic.

H. L. Foust and his coworkers from the Department of Veterinary Anatomy at Iowa State College have completed an interesting anatomical study of the bovine teat.1 One important point that they bring out is that the mucous membrane lining the teat canal is of a peculiar type, being arranged in a series of longitudinal and transverse folds and consisting of a very thin two-layered epithelium and a lamina propria of a young type of connective tissue. This makes it very susceptible to injury and also to excessive formation of scar tissue following injury. This explains the unsatisfactory results so frequently obtained from surgery on the interior of the teat. These investigators also show that in the formation of the udder in the embryo, the teat canal and the lactiferous cistern are for a while separated by a septum which may persist, resulting in the closure of the base of the teat seen quite frequently at the beginning of the first lactation period.

Udder and teat surgery require all the skill and surgical knowledge and attention to detail that we can muster. Unless we

^{*}Read at the annual meeting of the Southern Veterinary Medical Association, Birmingham, Ala., November 13-15, 1940.

fHead, Department of Veterinary Surgery, Iowa State College,

¹Foust, H. L.: The surgical anatomy of the teat of the cow. J.A.V.M.A., xcviii (Feb. 1941), pp. 143-149.

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are willing to go to great lengths along these lines, surgery of this region had better be let alone. Sloppy, careless work will not do here.

Sterilization of instruments had best be done by heat as it is not safe to rely upon chemical antiseptics. This may be done in the office and the instruments carried to the operation in some sort of sterile container.

In preparing the teat for operation, care should be used that solutions are not applied to the udder above the teat so they run down over the teat, bringing infection site of operation, being sure to inject quite deeply so as to infiltrate the mucosa as well as the skin.

As a general rule, the better the restraint, the better the surgery. Owners of dairy cattle do not like to have them cast, but for most teat operations, recumbency of the animal is a great aid. Another point of technic that is useful is to keep one hand to hold the teat and one to handle instruments, and do not change hands. One more aseptic hint is not to reinsert an instrument into the teat canal without resterilizing. Sometimes it is not prac-



Udder showing the sutured surgical wound of a recently amputated teat; performed at lowa State College.

-Photo by the author.

from above and concentrating it upon the operative area. It is better to cleanse the teat itself with soap and water and apply tincture of iodine. If the cow is to be cast for the operation, the udder should be protected by a piece of sterile muslin with a hole cut into it through which the teat can protrude. Anesthesia to the skin can be obtained by infiltration with 2 per cent procaine or other anesthetic, using a 20gauge needle, 1 inch long. The interior can be anesthetized by injecting 5 cc. of 4 per cent butyn into the lumen of the teat and insuring its reaching all parts by gentle massage for a few minutes. Another method is to infiltrate a ring of tissue completely around the teat well above the

tical to observe this precaution, but it should be done as far as possible.

An efficient antiseptic with as little odor as possible should be used. One with a strong smell can taint the milk of a dairy for several days. Our own preference is for therapogen, the odor of which disappears very rapidly.

ACUTE STOPPAGE AT END OF TEAT

The owner usually reports that the condition has developed quite suddenly. Sometimes the teat has been milked for a day or two with a milk tube, and frequently, there has been a yellowish scab on the end of the teat for a day or two that has been picked off to permit milking. On

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examination, the end of the teat is somewhat tender, and a small hard swelling can be palpated around the orifice.

This condition is nearly always caused by a flare-up of a chronic catarrhal inflammation that has existed for some time in the lower end of the teat. Swelling of the mucosa in the streak canal (the canal passing from the lumen of the teat to the outside and surrounded by the sphincter muscle) has occluded the orifice. Because of this inflammation, any idea of radical surgery must be abandoned or a very acute phlegmon of the teat with accompanying mastitis will probably ensue.

The teat should be immersed in a large tin cup containing 2 per cent boric acid solution at a temperature of 115° F. After 15 minutes the teat is dried with sterile cotton and tincture of iodine applied. With most cows, kicking chains are sufficient restraint. The teat is firmly grasped and an open Hug's tumor remover is pushed quickly through the teat orifice and then as quickly pulled out. This scrapes away crusts and exudates that have accumulated in the streak canal, opening it up without severe trauma. The teat is now milked a few times, sufficient milk being left in the quarter so that a few squirts may be withdrawn every hour during that day. If there is a tendency for the streak canal to swell shut again, the teat may be resoaked in warm boric acid solution for half an hour which usually relaxes it enough 30 milking may be done. The removal of milk at frequent intervals is most important.

Wax Dilators Taboo.—I do not believe in the use of wax teat dilators. In the first place, it is not good practice to put anything into the teat canal if it can be avoided, and in the second place they are advertised in every farm and dairy paper in the country and have probably been used by the owner before calling you.

STENOSIS OF THE TEAT ORIFICE

This is usually called by the owner, a hard milker. The lumen of the streak canal is reduced in size until only a small stream of milk can be expressed from the teat with great pressure. It is not a condition

with a sudden onset but is either congenital or develops from injury. There is no tenderness or other evidence of inflammation. Sometimes the excess connective tissue can be felt surrounding the streak canal, while in other cases it seems to be an inability of the sphincter muscle to relax. This is one of the most satisfactory of all teat troubles to handle. Kicking chains are the only restraint needed for most cows. Anesthesia is not used as the operation is over so quickly it causes less discomfort than the administration of anesthesia. The teat is thoroughly cleaned and tincture of iodine applied. The teat is grasped securely in the left hand and a sterile Stoll teat bistoury is inserted with a quick thrust pushed into the lumen of the teat, rotated 90°, and pulled out. The Stoll bistoury comes in three sizes, and the proper one to fit the particular teat should be used. It is important that this operation should be performed early in the lactation period so the incisions in the end of the teat may be kept open by the passage of large quantities of milk through it. For the first day, a few streams of milk should be forced out of the teat every hour and for the next three days at frequent intervals. It is useful to have tincture of iodine 1 part and glycerine 2 parts, applied to the end of the teat with a clean pledget of cotton three times a day for the first three days following operation. There is a tendency for spraying of the stream of milk for a few days, but it is seldom serious and disappears as soon as healing is complete.

BRUISED TEAT

This is a common accident in the cow with the pendulous udder. It is frequently caused by the teat being stepped upon, either by the cow herself or by her neighbor in the stable. On examination, the teat is seen to be swollen, very painful, and injured all the way from a slight bruise to complete crushing of the teat tissue. A very usual injury is to find the skin peeled off the teat. The milk can not be drawn, due to both the swelling around the teat orifice and the soreness which prevents the teat being handled. In severe crushing,

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amputation of the teat is necessary. lesser injuries, the teat should be soaked in boric acid or other odorless antiseptic solution for half an hour at a temperature of 115° F., and then tincture of iodine 1 part and glycerine 2 parts, applied. Many times this will relax the teat and soften it so it can be carefully stripped with the thumb and finger to remove the milk. In more severe cases, the milk tube will have to be used with all aseptic technic. It is dangerous to allow the caretaker to use the tube himself. Where this has to be done, he should be given complete and detailed instructions and then one should hope for the best, but be prepared for the worst. All too frequently, mastitis of the quarter develops due to defective sterilization of the tube. If extensive areas of skin have been removed, the teat should be protected by bandaging.

WOUNDS OF THE TEAT

These are very common and are usually barbed wire injuries. If the wound does not penetrate into the lumen of the teat, the problem is one of preventing infection and allowing the teat to be milked while it heals. In lacerated wounds the ragged skin edges can be trimmed with scissors where necessary and many times treated as an open wound. In other cases, suturing is desirable and metal wound clips have been found very satisfactory. Usually the teat can be milked if an antiseptic such as tincture of iodine in glycerine, 1 to 3, or 5 per cent phenol in cotton seed oil is applied to the wound fifteen minutes before milking. This softens the wound surface so that milking can be done if performed carefully. If not successful, the milking tube may have to be used.

If the wound has penetrated into the lumen of the teat, milk will be seen passing out. There are two ways of handling these cases. Probably the most satisfactory is to treat as an open wound. In this case, the teat heals and leaves a small fistula which persists indefinitely. This may be operated successfully during the next nonlactating period when milk will no longer be flowing through the wound.

The second method is to suture the wound, using metal wound clips. No special attempts are made to unite the mucosa. the clips being placed close enough together to produce as perfect wound closure as possible. Interrupted silk sutures may be used instead, if desired. After placing the sutures or clips, the end of the teat is slit open on the medial side for half or three quarters of an inch. A Case teat slitter is satisfactory for this purpose as it allows complete control of the amount of slitting and cuts with a sliding stroke instead of tearing. Slitting of the teat allows a free passage of milk through it, so not so much comes through the wound in the side. This method of securing drainage may also be used in purulent mastitis. Little trouble has been experienced in healing of the slit in the orifice of the teat, but only occasionally has the original wound healed. Many times it has apparently closed, only to open up in one corner a few days later.

TEAT FISTULA

This is a fistula in the side of the teat through which milk flows. Usually it is the result of a penetrating wound. The operation should only be done during the dry period when no milk is present in the udder. If properly performed at this time, it is nearly always successful. Very fine fistulas may be treated with the needlepoint cautery. Larger ones should be operated by dissection and suturing. Under local anesthesia, the fistula is dissected and removed, using a small scalpel with a keen edge. The resulting wound is sutured with No. 2 catgut and protected with a gauze and adhesive tape dressing for a few days. By using catgut instead of silk, the sutures do not have to be removed.

AMPUTATION OF THE TEAT

Amputation is sometimes necessary following severe wounding or bruising. It should not be performed too soon or too hastily, as many times damaged teats will recover when it seems impossible. Anesthesia is by infiltration completely around the teat well above the damaged area. Restraint in the recumbent position is advis-

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able. About four small curved hemostats are necessary. The teat is amputated close to the udder. The hemostats are clamped on the bleeding vessels, of which there will be many. A curved needle carrying No. 18 silk suture material is inserted through the skin, the substance of the teat, and then the mucosa. About half an inch further over, the needle is again inserted through the mucosa, teat substance, and skin and the silk tied forming a mattress suture.

Similar sutures are placed completely around the stump of the teat, slightly overlapping each other so as to control all hemorrhage. The case should be watched for a day or two for sometimes teats with a small lumen may swell shut. If so, the opening may be spread with sterile forceps a few times daily until the lumen remains open.

Nearly always the quarter will drain milk steadily for a few days and then slowly dry up. Once in a while the quarter will again secrete milk the next lactation period, which is a great nuisance to the caretaker, but usually, it remains dry.

TEAT TUMOR

True tumors of the teat and udder are rare. It is a curious thing that tumors of the mammary gland in the human are so common, while in the bovine species they are so rare. What is so often miscalled tumor in the teat of the cow is a chronic inflammatory growth. This explains why satisfactory treatment is so difficult. The operative trauma only adds to the inflammation already present and soon the condition is worse than when treatment began. The literature is full of various and sundry instruments and methods of approach for these growths within the teat canal; a certain indication that none of them is of much value. As a general rule, most of these conditions are best left unoperated and the quarter abandoned. Usually, it has to be abandoned anyway, after a great deal of trouble to all con-

Pedunculated growths offer more hope than flat diffuse ones. Those in the middle of the teat are more promising than those near the udder or at the orifice. Those completely encircling the teat are the worst of all.

Anesthesia by injection of 4 per cent butyn into the teat lumen or by infiltration of a ring around the teat above the site of operation is necessary. Restraint in the recumbent position is a great help. aseptic precautions should be observed, the udder draped with sterile muslin containing a hole through which the teat protrudes and tincture of iodine applied to the teat. The introduction of most instruments into the teat requires dilatation of the orifice, which can be done very efficiently with Moore's teat dilator. By gentle manipulation with this instrument, the sphincter can be relaxed with no damage to the mucous membrane. If the growth to be removed is far enough down in the teat, a rubber band can be placed around the teat near the udder to keep blood from getting into the milk sinus where it can cause a great deal of trouble.

Pedunculated growths can be removed by grasping and twisting with a small pair of forceps, or they may be held with the alligator forceps and cut from their attachment with the alligator scissors or one of the many forms of blunt pointed teat bistourys. Care should be used to traumatise the teat as little as possible.

Diffuse growths can be removed or rather reduced in size by means of the forceps and bistoury if they project enough to be grasped with the forceps. Usually they do not, and then Hug's tumor remover has proved the best instrument. The instrument is inserted, the growth pushed over to it, and the instrument closed, cutting off a small piece of tissue. About two bites can be taken when the instrument will be full and must be removed. The ideal method is to have several of these instruments so that a sterile one may be now inserted and some more connective tissue cut off and the process repeated as often as necessary. If only one instrument is available, great care must be used to see that it does not become contaminated between its removal and reinsertion. As a last resort, an incision may be made in the side of the teat,

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exposing the growth to both sight and easy operative procedure. Too often, mastitis follows this method, and if the udder is lactating, a milk fistula usually follows.

Many other instruments than those mentioned are for sale and most practitioners in dairy regions have devised some of their own, but the sad fact is that the results are about the same with all of them; very unsatisfactory in too many cases.

The aftercare of these cases is many times a problem. The application of hot packs to the quarter twice daily at a temperature of 115° F. will help to prevent mastitis. Blood clots that have formed in the milk cistern should be broken down by careful massage and removed by stripping the teat between the thumb and finger. Injection of any solution into the teat canal to wash out these clots is dangerous from the standpoint of mastitis. Internal medication, to prevent infection, with formalin and similar drugs has not proven worth while.

MEMBRANE ACROSS BASE OF TEAT

This condition is noticed at the onset of the lactation period. The quarter is firm, hard, but no milk can be brought down into the teat. Usually the quarter is not painful.

There are two distinct types of this condition. H. L. Foust and his colleagues in the work previously mentioned have shown that sometimes the septum that in the embryo separates the teat canal from the lactiferous sinus persists into adult life. This is not noticed until the heifer freshens. In most cases, this septum is thin and delicate and easily broken. The prognosis of this form is favorable as a rule.

Restraint in the recumbent position is highly desirable. Five cc. of 2 per cent butyn may be injected into the teat canal and spread upwards by massage to the septum. With all aseptic precautions, the teat orifice is dilated and a blunt pointed dental probe inserted through the membrane, teating it down in several places. This method as a rule produces little hemorrhage and is superior to the use of

cutting instruments. Any blood clots that should form are removed in the manner described under teat tumors.

The second type is due to a growth of connective tissue caused by chronic catarrhal inflammation and is frequently seen in older cows. The prognosis is distinctly unfavorable, as in addition to the danger of acute mastitis following operation, it almost invariably closes again in a few days. It is by all odds best to let it alone, as surgery will only bring trouble. This is sometimes seen in heifers at the beginning of their first lactation period where the inflammation that produced it has been brought about by allowing young milk fed calves to suckle the heifers.

If an operation is attempted, the same method is used as given for the first type. Frequently, the septum of connective tissue is so thick it can not be torn; in which case it must be cut with a bistoury. In this case, hemorrhage is frequently quite severe.

If the case is not operated, the quarter becomes quite hard and painful for a few days and then gradually atrophies. Very seldom is there sufficient infection of an acute type to produce a flare-up of mastitis.

ACCESSORY TEATS

These are quite common in the dairy cow. They may be only a blemish to a show cow, or they may have enough secreting tissue connected with them to be a great nuisance by dribbling milk at milking time. They may be situated on the udder, but the most annoying kind are those on the normal teats.

If possible, these should be operated before the udder has begun functioning. The next best time is during the period of non-lactation. Do not operate those connected with secreting tissue during the lactation period as there is considerable danger of mastitis ensuing.

Recumbent restraint is very helpful. Infiltration anesthesia with 2 per cent procaine or similar anesthetic is sufficient. With all sterile precaution the teat is removed by a long elliptical incision on each side. The wound is now closed with silk and protected from infection by collodion

Intravenous Anesthesia in Large Animals*

GEO. R. FOWLER, D.V.M.+

Ames, Iowa

GENERAL ANESTHESIA in large animals is. with few exceptions, produced either by inhalation of volatile drugs or by intravenous injection. The advantage of the intravenous method is that the anesthetic may be given by the surgeon before beginning the operation, who may then proceed with the surgery with little or no attention being required by the anesthesia. As most veterinarians must operate without skilled anesthetists this advantage is an important one. The last few years have seen a great increase in the use of intravenous anesthesia due to new drugs suitable for such use and also to improvements in instruments and technic.

INTRAVENOUS ANESTHESIA IN SOLIPEDS

The first drug to be used in this manner was cannabis Indica. It had too many disadvantages to become popular. At present it is almost unobtainable due to the strict narcotic regulations.

CHLORAL

In the adult horse chloral hydrate is the most satisfactory drug today. It is reasonably cheap, stable, easily prepared and quite safe. Purchased in solution ready to use, it is very convenient but more expensive

than self-made preparations. We have found it satisfactory to keep on hand a few 500 cc. brown, serum bottles, thoroughly cleaned, filled with normal salt solution, sterilized and corked with the original rubber stopper. When a solution is needed, two ounces of chloral hydrate are dissolved in one bottle. This makes about a 12 per cent solution which has proved to be the most convenient. For the 1,500-pound horse, two bottles are prepared. Since this solution if kept longer than a few days turns cloudy, we prefer to make it fresh when needed.

The technic must be perfect as chloral hydrate is escharotic. Even a small amount injected perivenously will cause necrosis. The instruments necessary are a 14-gauge, hypodermic needle $1\frac{1}{2}$ inches long; a long 18-gauge needle, with a closed end and two small side openings, known as a tom cat catheter; and a rubber injection outfit that can be fitted over the mouth of the bottle containing the chloral hydrate solution. The best style is that with a small rubber tube coming from the side of the rubber cap to admit air. The needles should be of corrosion-proof material. All equipment is sterile,

For operations of short duration where profound anesthesia is not required, the horse may be led to the place where he is to be restrained and the casting harness An area over the jugular vein and about two-thirds of the way up the neck is shaved and tincture of iodine applied. The cork is removed from the bottle of chloral hydrate and the injection outfit attached. The right handed operator will find the right side of the neck most convenient. The jugular vein is distended with the left thumb and the 14-gauge needle inserted into the vein with a quick thrust. When blood flows freely through

(Continued from page 398)

and cotton or by gauze and adhesive tape. In a few days the silk is removed. One author has described a method by which the base of the accessory teat is crushed by means of Burdizzo forceps. This seals all the tissues shut. The teat is then cut off at the line of crushing and the stump sutured with silk.

^{*}Read before the annual meeting of the Southern Veterinary Medical Association, November 13-15, 1940.

[†]Department of Veterinary Surgery, Iowa State College.

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this needle, the long needle is inserted through it into and along the jugular vein, until its hub contacts the hub of the short needle. The bottle of chloral hydrate is inverted until some solution runs from the end of the injection outfit to free it of air and the end attached to the hub of the long needle. As the solution enters the vein, air bubbles arise in the bottle. The speed of injection can be slowed by finger pressure on the small tube that admits the air. The solution should not be injected too rapidly as shock may be produced.

When the horse has received enough of the chloral solution, he will weave from side to side and soon go down. Just before he falls, the needle may be removed from the vein. When the casting harness is tightened, the horse is secured and is ready for a minor operation.

For long and painful operations, a different procedure is advisable. This is also recommended for unbroken or fractious animals. It makes handling and casting much easier. A basal narcotic is given about 30 minutes before operating. This consists of chloral hydrate given with a stomach tube. The amount to give varies according to the vigor and size of the animal and the fullness of the digestive tract. As a rule, one-half ounce of choral to each 500 pounds of body weight is correct. A 1,500-pound horse would receive 11/2 ounces dissolved in a gallon of luke warm water. As the chloral affects the animal, he becomes quiet and if not disturbed will seem half asleep and will stagger a little if moved. The casting harness is now applied and the horse cast and secured. He may struggle a little while this is being done. The area over the jugular vein is shaved and tincture of iodine applied, and the chloral hydrate solution injected as described before. As the injection proceeds, the horse is watched carefully until under the desired degree of anesthesia.

After the injection of a small portion of the anesthetic, a slight amount of struggling is frequently seen. This corresponds to the excitement stage of chloroform anesthesia but is so transient that it many times escapes notice. The horse falls into

a state resembling sleep. The palpebral reflex is tested by touching the eyelid mar. gin with the finger. If blinking occurs, the reflex is still present. This reflex is the first to be obliterated. It indicates the beginning of anesthesia. As the injection of the chloral solution continues, nystagmus or spasmodic rolling of the eyeball begins. This becomes faster until the eye rolls quite rapidly. The nystagmus then quiets down to an occasional slow roll. This indicates surgical anesthesia. When nystagmus completely disappears, care is taken not to push the anesthesia much deeper. The corneal reflex is tested by touching the finger to the cornea. If no blinking occurs, the reflex is abolished. Extreme care is used in testing for this reflex as the cornea is easily damaged. The finger should always be clean and well moistened and the cornea touched as little as possible. Complete obliteration of the corneal reflex indicates profound anesthesia, a state close to the borderline of cardiac and respiratory failure. If nystagmus has practically disappeared and the corneal reflex is still present but much weakened, the desirable stage of surgical anesthesia is present. The injection of the chloral hydrate solution is then stopped. Anesthesia should last 30 minutes or longer. In long continued operations, it may be necessary to inject a little more of the anesthetic, but usually, it is not necessary. A 1,500-pound horse will usually require about a bottle and a half of the solution, or 750 cc. This is 3 ounces of crystalline chloral hydrate intravenously and 11/2 ounces given by the stomach tube. More than this approaches the danger line.

During the injection period, the pulse rate will increase somewhat, but soon slows almost to normal. A jugular pulse is nearly always seen as anesthesia begins but should cause no worry. The extreme dilatation and subsequent contraction of the pupil, which is so prominent in chloroform anesthesia, is not present to any extent in chloral hydrate anesthesia. The respiration should be regular and possibly slower than normal. Uneven and jerky respiration, so

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common with chloroform, is rare in this method.

Recovery is usually slower than following chloroform, if a profound degree of anesthesia has been reached. This may or may not be an advantage. Sometimes an unduly long period of recovery occurs and occasionally delirium is seen. The heat regulating mechanism is seriously depressed. In cold weather the horse should be blanketed immediately after the operation and kept so for several hours. In extremely hot weather, look out for heat prostration.

The pharyngeal reflex is depressed for some time, so feed and water should be withheld for four or five hours following the use of chloral hydrate or mechanical pneumonia may follow.

Nembutal has not been satisfactory in the adult horse but is excellent for colts up to 6 or 7 months of age and especially for the foal of a few days to a few weeks. It is also useful with Shetland ponies. Nembutal is supplied in 100 cc. bottles and is used in comparatively small amounts. The injection apparatus described is not practical, so a syringe is used instead. The foal is supported by a man on each side, the two needles are inserted in the jugular vein as described before. The nembutal is injected slowly, and the onset of anesthesia is smooth and even. The colt goes to sleep on its feet and slowly sinks to the ground without a struggle. This method of anesthesia is desirable in foals for such conditions as fractures of the long bones. Owing to the lack of struggling, there is no danger of further damage to the injured parts during the onset of anesthesia. For small foals, as little as 5 cc. may be sufficient. Larger colts and ponies may require as much as 50 cc. but the average dose of nembutal is around 25 cc. Soon after the beginning of the injection, the pulse rate increases markedly and the respirations become slower and shallower. As the body temperature is reduced markedly, the colt is kept covered even in fairly warm weather. Recovery is slow, but there is

little "hangover." The animal appears bright and normal the next day.

INTRAVENOUS ANESTHESIA IN BOVIDAE

In cows of the smaller breeds and in calves and heifers of the larger breeds up to 900 or 1,000 pounds in weight, nembutal is satisfactory, except that in some cases the expense might be a disadvantage. The amount required for a medium sized Jersey will vary from 75 cc. to 125 cc. The drug is injected into the jugular vein in the same manner as in the colt, except that it usually is preferable to cast the cow first. In the ox, anesthesia may be carried to complete suppression of the corneal reflex without as much danger as in the horse, so disappearance of this is used as the indication of surgical anesthesia. The pulse becomes quite rapid and the respirations slow and shallow. Recovery takes longer than with chloral hydrate and the same precautions regarding blanketing in cold weather should be observed.

In larger cows and where the expense would make nembutal impractical, chloral hydrate may be used intravenously. The same solution and equipment is used as in the horse and the same technic in general, except that the basal narcotic is not so necessary. As with nembutal, the disappearance of the corneal reflex indicates surgical anesthesia.

There is one peculiarity of general anesthesia in the bovine species that is worth considerable notice. The large bull of any breed and the heavy beef cow are so susceptible to the toxic effects of any general anesthetic that its use should not be attempted. Even oral administration of chloral hydrate is dangerous. In these animals only local anesthesia should be used.

In large swine, nembutal used intravenously is quite successful. This is very useful in caesarian sections, but if the pigs are alive they will be anesthetized also. The amount of nembutal required is usually small: between 10 cc. and 20 cc. This is injected into the marginal ear vein, a procedure that is not too difficult after a little practice. A glass syringe with a 1-inch, 20-gauge needle, is used. The vein is

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raised and the needle is inserted into it. The plunger of the syringe is then slightly withdrawn. If the needle is in the vein, blood will be drawn into the syringe. When this is seen, the nembutal is slowly injected until anesthesia as determined by disappearance of the corneal reflex is obtained.

With any form of anesthesia, the question of what to do in case of the appearance of toxic symptoms is a problem. Unfortunately, there is not much that can be done. Removal of all restraint and cessation of surgical procedures are always in order. Chloral may produce either cardiac or respiratory failure or both. Nembutal usually depresses the respiration

until failure occurs. Many drugs have been recommended as antidotes. Picrotoxin and coramine are cortical stimulants and have been suggested because in anesthesia the cortex of the brain is depressed. Their use has been disappointing. Caffeine is probably as good an antidote as any, Metrazol is used to some extent in small animals. We have experimented with it in large animals but not enough to make any definite statement. Artificial respiration in nembutal poisoning is sometimes effective but may have to be continued for a long time. The best cure is prevention by slow injection, careful check of the reflexes and not carrying the anesthesia too deeply.

Staff of the Division of Veterinary Medicine Alabama Polytechnic Institute



Left to right, first row: R. S. Sugg, dean, School of Veterinary Medicine, and state veterinarian; Miss Edna Thompson, secretary, dean, School of Veterinary Medicine; Mrs. Bessie Emrick, secretary, veterinary medicine; Mrs. Harold Wilford Nance, librarian and secretary, School of Veterinary Medicine; Miss Mildred, part-time instructor, department of bacteriology; W. E. Cotton, consultant and lecturer on infectious diseases.

Left to right, second row: E. S. Winters, associate professor of physiology; T. C. Fitzgerald, professor of anatomy and histology; L. E. Starr, professor of pathology and parasitology; B. T. Simms, principal veterinarian, BAI, USDA; F. P. Woolf, assistant professor of large animal surgery and medicine; I. S. McAdory, associate state veterinarian, professor of surgery and clinics; Don C. Boughton, assistant protozoölogist, BAI, USDA; M. O. Robinson, professor of bacteriology.

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CLINICAL DATA

Riboflavin Deficiency in Chickens

Riboflavin-deficient food for chickens results in poor growth and a form of leg weakness known as curled-toe paralysis. In the breeding flock the result is low hatchability. Prevention lies in the use of food rich in this factor: liver meal, milk and milk products, yeast, fresh vegetables or green dried food such as alfalfa meal, young growing grass, clover, etc.—From The Veterinary Journal, January 1941.

Gapeworm Cure

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Workers of the BAI have discovered a cure for gapeworms—chick plague of considerable importance. Weher, Harwood and Schaffer found that infected chicks treated with inhalations of barium antimonyl tartrate dust were able to throw off the worms. Ninety-eight per cent of the chicks thus treated were cured.

Barium antimonyl tartrate is made by mixing tartar emetic with barium chloride. The government has applied for a patent for the product and will give the public free use of it.

The Treatment of Scours in Newborn Calves

Cows should freshen in clean stalls. Leave the calf with the mother for 12 hours to allow it to obtain the colostrum. See that the navel is disinfected with iodine. Keep the calves in a clean, dry place free of drafts. At the end of twelve hours with its mother, the calf is muzzled and kept from consuming any food for the next 24 hours. At the end of this fasting period a pint of milk and lime water warmed to body temperature is fed in a scalded pail. The feed to allow on the third day is its mother's milk amounting to 6 per cent of the calf's weight. This amount is divided into three equal portions to each of which

is added a pint of lime water. The milklime mixture is heated to body temperature and fed in a scalded pail. Increase this ration a half pint each day. Keep a muzzle on the calf to prevent it from eating bedding or other contaminated material.— Chas. H. Haasjes, D.V.M., Shelby, Mich.

Serum-Culture Vaccination in Swine Erysipelas

There being no certainty prior to 1937 that swine erysipelas was firmly rooted among the swine of this country, the 40year-old serum-culture vaccination of Europe was not permitted. "Obviously," says the Omaha Journal-Stockman, "if live germs were to fall into the hands of quacks. they might peddle the disease itself into new areas which had never known it. . . . However, Dr. L. Van Es and his associates of the University of Nebraska are doing all they can to make it unpleasant for this visitor. . . . Veterinarians of Nebraska and other swine-producing states now have a powerful though dangerous weapon with which to fight the disease."

Up to the present time (April 1941) under the direction of federal and state officials, 63,000 head of hogs from 864 herds have been given serum-culture vaccination. It is reported that 844 of these herds were benefited. Out of 432 pregnant sows vaccinated, but 10 showed unsatisfactory results.

Skimmed milk contains the sugar, protein, the important minerals and the vitamin G (riboflavin) of milk and is, therefore, as valuable in these respects as whole milk.

That irradiation of milk to step up vitamin D potency does not destroy the vitamin A and riboflavin content was shown by Peterson and Dornbush of the University of Wisconsin.—Hoard's Dairyman.

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Diaphenylamine: Parasiticide for Screwworms

The U.S. Bureau of Entomology and Plant Quarantine announces that the large number of screwworms that survived last winter is a potential threat to livestock this year. The number of screwworms in the Laredo (Texas) area was found to be unusually high by the workers of the field laboratory of the Bureau at Uvalde, Texas, and more than the average number of larvae and flies withstood the winter in Arizona and southern California. Department of Agriculture urges careful inspection at loading points of livestock shipped from these points and Georgia, Florida and South Carolina, in order to check the spread to parts north.

The new screwworm treatment is the crystalline chemical, diaphenylamine, used in the dye industry. In critical tests it was found effective in protecting wounds against infestation for at least three days. When the wound is infested, benzol is applied to kill the worm, and then the dye to ward off reinfestation.

Avitaminosis A in Poultry

Although it has been generally believed that growing chicks receive sufficient vitamin A in their usual diet, the unstable character of the carotenes (precursors of this vitamin), demonstrated by Fraps and Kemmerer (1937) and by Taylor and Russell (1938), may be responsible for borderline avitaminosis A. Elvehjem and Neu (1932) found kidney degeneration in chicks not receiving sufficient vitamin A. Alterations in the mucous membranes of the digestive tract and upper air passagesforerunners of infections-occur in chickens fed vitamin A-deficient rations. There exists the probability that chicken feeds may lose vitamin A value before they are used, notwithstanding that the optimum amount may have been present at the time of mixing.

Sherwood and Fraps (1936) found that up to 8 weeks of age, chick mortality increased when the vitamin A content of experimental diets was reduced to 325 international units per 100 Gm.

Livers of chicks were used as the criterion, since for this vitamin the liver store varies with the intake. Eighty-three liver samples from 25 commercial flocks suspected of being vitamin A deficient were assayed. Of these, 13 samples contained no vitamin A and 30 samples contained less than 15 blue units per gram of liver sub-The authors concluded that borderline deficiency was at least partly responsible for the slow growth of these chicks and that vitamin A deficiency in commercial flocks may be more important than is generally realized. [Rubin, Max, and Bird, H. R., Department of Poultry Husbandry, University of Maryland. Avitaminosis A in Commercial Poultry Flocks. Poultry Science, xx (March 1941), pp. 155-160.

The Treatment of Brittle, Cracked Hoofs in Horses and Mules*

L. E. BECKMAN, D.V.M.

Tuscaloosa, Ala.

We are often called upon to treat horses and mules affected with brittle, cracked hoofs, since the old adage "no foot no horses" is as true today as in days gone by. For a number of years we had a fair degree of success with local counter-irritants, but recent experiences have shown that an alterative treatment is required. [Hoof, like hair, is an appendage of the skin and may therefore be subject to the cutaneous alterations of chronic ill health.]

The alterative-tonic preparation recommended and used successfully is composed of: arsenous acid, $2\frac{1}{2}\%$; copper sulfate, 9%; iron sulfate, 20%; ground wormseed, 20%; powdered areca nut, $48\frac{1}{2}\%$. This mixture is given in tablespoonful doses in the feed twice a day. Tasty feed containing molasses or cottonseed meal is preferred.

The first animal given this treatment was a five-year old presented at one of our

^{*}Reported at the annual meeting of the Southern Veterinary Medical Association, Birmingham, Ala., November 13-15, 1940.

bot clinics. He weighed but 500 pounds, was very thin and had patches over the body denuded of hair that suggested external parasites. The feet were brittle and cracked, mucous membranes pale and though the appetite was good, he was losing weight. The bot treatment (carbon disulfide) had brought no improvement, the owner reported a month later, whereupon he was given a pound of the above mentioned alterative in the manner described. In six months, this animal weighed 950 pounds, and had smooth hair and sound feet.

Another case was that of a sorrel show mare, in good condition with the exception of bad feet. After receiving two pounds of this powder, the feet showed material improvement.

A bay gelding weighing 950 pounds had feet too brittle to hold the shoes. His coat was dry and lacked the luster of health. Results from the treatment: improved condition, smooth coat and healthy hoofs.

An old, lame, saw-mill mule, crippled from brittle feet responded to this treatment in 30 days and is now wearing shoes.

Other preparations of the same general nature would probably give the same results, when owners coöperate by feeding the alterative regularly.

Regarding Encephalomyelitis

Suckling colts and young horses respond better to treatment for encephalomyelitis than adult and aged horses . . . antiserum is of no value unless given early . . . the usual dose of antiserum recommended is too small and sufficient dosage is too expensive . . . drastics are contraindicated because they augment the dehydration . . . avoid nux vomica, strychnine and alcohol . . . the high protective value of chick-embryo vaccine has been definitely proved . . . an attack does not confer a lasting immunity.—Farquharson.

Milk is a poor source of iron and ascorbic acid (vitamin C).

The Disadvantages of Artificial Insemination

Although artificial insemination in cows seems certain to grow in popularity because of various advantages well known in the veterinary profession, there are disadvantages to bear in mind, namely:

- 1. The difficulty of the technics in untrained hands and the scarcity of trained technicians.
- The possible use of semen obtained from inferior bulls by unscrupulous persons.
- The need of fewer bulls will lead to a reduced number of proved sires in the breeding field.
- 4. The danger of spreading genital infections through careless methods.

Among the unknowns of the art are (1) the minimum tolerance of bulls to repeated semen collections; (2) the harmful effect of time on the virtues of semen; (3) the effect of the artificial vagina on the bull's sexual impulse (libido), and (4) the parturient result of using large bulls on small cows.

Vitamin C in Potatoes

Whether old or new, boiled, steamed or baked, potatoes contain a considerable amount of vitamin C. Less than 25 per cent of the ascorbic acid generally is lost in cooking. The loss is greatest in potatoes boiled after paring. In the army, potatoes are depended upon to supply one sixth to one fourth of the soldiers' vitamin C requirement.

Cases of pneumococcus pneumonia in man in which serotherapy is employed show a mortality of about 15 per cent. In cases in which chemotherapy (sulfapyridine, sulfathiazine) is used, the mortality is from 6 to 8 per cent.—From Therapeutic Notes.

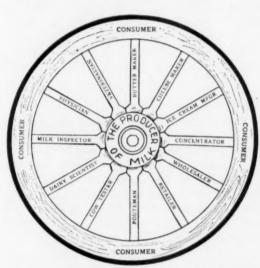
Paris reports that the livestock of France has been reduced by one half. "The shortage," says our correspondent, "affects not only the food supply, but also the supply of drugs of animal origin."

CURRENT LITERATURE

ABSTRACTS

The Dairy Wheel

All branches of dairying are portrayed in the form of a wheel by Hadley in Hoard's Dairyman. The author properly represents the producer as the hub and the consumer as the felloe. The twelve spokes connecting these two units represent the personnel required to operate this ranking enterprise of food production. While the article and illustration contain nothing especially new, the manner of presentation



-Courtesy of Hoard's Dairyman.

is novel to all concerned and manifestly informative to a public that is none too well aware of what cow's milk means to this civilization. Certainly, few are aware of the part played by various sciences in building the wheel that rolls along so efficiently despite its numerous ramifications.

Within the hub—the producer—lie all of the problems of dairy husbandry (breeding, feeding, housing, milking) which the consuming public seldom weighs. The

spokes are the physician, who watches the health of the milkers; the veterinarian. who certifies to the health of the cows; the milk inspector of the city or state, who sees that statutes are obeyed; the dairy scientist, who investigates nutritive values: the manufacture of dairy products, and industrial usage; the cow tester, whose function is concerned with improved herd production: the makers of butter, of cheese. of ice cream, and of condensed milk; and, lastly, the wholesaler, the retailer, and the routeman, all of whom work expertly in such a way as to cultivate the confidence of the consumer—the felloe and tire—who is the source of the cash income that furnishes the power to make the wheel run. [Hadley, B. F. Professor of Veterinary Science, College of Agriculture, University of Wisconsin, Hoard's Dairyman, February 25, 1941.]

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Hormones and Vitamins in Acetonemia of Cows

The usual treatment of calcium gluconate and dextrose was supplemented with anterior pituitary extract, gonadin, vitamin B₁ and vitamin C. In a number of cases of acetonemia the reports of Lawrence of New Jersey and of Fincher and Hayden of New York on the use of anterior pituitary extract in treating that disease are cited.

The general plan was to administer the usual amounts of calcium gluconate and dextrose solution and then prop up the treatment with the above-mentioned products. Anterior pituitary extract appeared to shorten the duration of the disease and restore the depressed lactation in a much shorter time than usual. While vitamin B_1 stimulated the appetite, the general results were less favorable than when the hormone

was given. In the final result gonadin was about equal to the pituitary hormone but slower in its effects. Vitamin C was tried owing to its high concentration in the pituitary gland and because of its reputed action on impotent bulls. The effect in a second-calf heifer that was down before calving was excellent but the observation is too limited to be of value.

All of the cases were confirmed by the ketone test. The author's conclusions based upon a year of observation and the tabulated report are that, at least, anterior pituitary extract has its place in the treatment of acetonemia. [Dennis, W. B., Trion, Ga. The Use of Hormones and Vitamins in the Treatment of Ketosis. Unpublished paper read before the annual meeting of the Southern Veterinary Medical Association, Birmingham, Ala., November 13-15, 1940.]

Carbon Disulfide Poisoning

A report of the U. S. Public Health Service on the toxicity of carbon disulfide names the rayon, rubber, fumigation and chemical industries as sources of exposure to that chemical. In the chemical industry, it is used as a solvent for fats, oils and phosphorus and also in the manufacture of carbon tetrachloride and water-proof cement. [No mention is made of the manufacture of bot capsules for horses.]

Acute poisoning occurs from the inhalation of high concentrations, but chronic carbon disulfide poisoning is more common than acute. Acute poisoning leads to delirium, unconsciousness and death from cardiac failure. Less severe exposure causes giddiness, headache, precordial distress and gastrointestinal disturbances. The chronic form is characterized by toxic effect on all nervous structures, blood and other organs. The acute may be transformed into the chronic form manifested by fatigue, loss of memory, heaviness of the limbs and vertigo. The symptoms disappear rapidly in fresh air, but if the exposure is repeated, the symptoms may persist. Besides, there may be insomnia, sleepiness during the day, weakness, loss of flesh, constipation, diarrhea, frequent urination, fainting spells, staggering gait, visual disturbance, reduction of palpebral reflexes, circumscribed paralysis, atrophy of muscles, maniacal or depressive psychoses, etc. [National Institute of Health. Carbon Disulfide: Its Toxicity and Potential Dangers. Public Health Reports, lvi (March 21, 1941), pp. 574-581.]

Liver Damage from Carbon Tetrachloride

Macrocytic anemia (in man) frequently has been associated with disorders of the liver (cirrhosis, acute yellow atrophy, etc.). In 1936, the author described such an anemia resembling Addisonian anemia occurring in the visceral stage of schistostomiasis mansoni in Puerto Rico. This anemia is related to cirrhosis of the liver due to infestation with a parasitic trematode living in the portal system of the liver. The blood picture seems to be due to a deficiency of the specific antianemic factor (Castle) related to cirrhosis and not to gastric dysfunction. To prove the contention, experimental damage to the liver was induced in hogs by administering carbon tetrachloride.

Except as a contribution to the toxicology of carbon tetrachloride, the experiment is of no value in veterinary medicine. Five Berkshire pigs were used, two of which were controls. They were 3 months old and weighed 10 to 15 kg. each. The dose varied from 1 cc. to 7 cc. per kilogram of weight daily, for periods of two to four

W. T. Oglesby, head of the veterinary science department of Louisiana State University.



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months. The earliest symptoms of poisoning occurred in two weeks. Death occurred in 8, 17 and 30 weeks. The symptoms were ushered in by a temporary anorexia and weakness followed by irritability and stiff convulsive gait. Near death the stiffness was marked. The skin of the belly became brick colored. There was neither ascites nor jaundice. The urine was scant and reddish and emitted the odor of ammonia. The red cell count ranged from 4 to 6 million. The platelet count fluctuated between 180,000 to 400,000, dropping to 100,000 two weeks before death.

The autopsies showed a similar state in all of the livers. They were pale, but of normal texture. Microscopically there were revealed marked hemorrhagic necrosis centrally and pronounced vacuolization of the peripheral cells and lobules with round cell infiltration, bile stasis, bile-stained Kupffer cells and slight accentuation of connective tissue. In the central portion there was considerable fibrosis with increased round cell infiltration including polymorphonuclears. [The experiment was intended to produce cirrhosis.] The kidneys, lungs and spleen were congested and the adrenal glands were necrotic. Summed up, central liver necrosis was the main result of this intoxication, which is a well-known result of dosing animals with this popular type of anthelmintic. [Molina, Rodiguez R. Experimental Liver Damage Associated with Hemorrhagic Changes in Hogs. The Puerto Rico Journal of Public Health and Tropical Medicine, xv (1940), pp. 262-271.]

Water Consumption of Hens

Bert W. Heywang of the United States Bureau of Animal Industry at Glendale, Ariz., computed the water consumption of hens, using as experimental subjects 26 White Leghorns and 21 Rhode Island Reds. The observation extended from November 1, 1934, to October 31, 1935. The hens were quartered in adjacent pens of the same house, each having 400 sq. ft. of floor space. The air temperatures (Fahr.) ranged from 27° in January to 112° in August. The average air temperature for

the period was 82.2°. The hens were weighed at the beginning and at the end of each two weeks. The water used to moisten the mash was computed and evaporation was accounted for.

Though the consumption was highest during the hot weather months, the difference was not equally great, since both egg production and weight diminished as the temperature rose and thus reduced the need for water. All things being equal, however, hot weather was found to increase the thirst. In general, the water consumption varied according to live weight and egg production. Tables showing precise figures on weight, egg production and water consumption for each two-week period are given.

For the 26 White Leghorns, the average water consumption of each two weeks, per hen, ranged between 0.5140 gal. in December and 1.0169 gal. in June. The average water consumption per hen for the year was 18.25 gal.

For the 21 Rhode Island Reds the range per hen was from 0.5795 gal. in August to 0.9167 gal. in June. In this breed, the average water consumption per hen for the year was 19.85 gal. [Heywang, Bert W. U. S. Bureau of Animal Industry. The Water Consumption of Hens. Poultry Science, xx (March 1941), pp. 164-187.]

Milk Fever in Ewes

Milk fever in ewes is difficult to differentiate from pregnancy disease. It affects ewes heavy in lamb. Except that the attack comes on suddenly, the symptoms are the same as those of pregnancy disease, which comes on gradually, and the incidence in the flock is higher. Both diseases may follow a train journey, particularly in ewes 5 to 15 weeks from term. Such ewes The disease should not be transported. occurs less frequently in ewes closer to lambing time. Milk fever in ewes responds to inflation of the udder and to calciumborogluconate. The dose is 40 cc. of a solution made by dissolving 2.5 cc. in boiling water, and boiled for one minute. It is given subcutaneously when cooled.

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treatment is not effective in pregnancy disease. The failure of the treatment to effect a cure indicates that the trouble is not milk fever. [C. T. McKenna, B.V.Sc., M.R.C. V.S. Some Seasonal Diseases of Sheep. Journal of Agriculture, South Australia, gliv (Jan. 1941), p. 318.]

Artificial Insemination of Minks

As told by Wegner, artificial insemination holds out a number of obstacles which, though not insolvable, are not easy to overcome. In female minks there are many blanks, and minks come in heat but once a year, about the 10th, 17th, 23rd and 30th of March. But according to Ender of Swarthmore College, ovulation occurs just once, and then only when the female is excited by the male. If she does not conceive from one mating, it is not probable that she ever will.

To carry out artificial insemination it would, therefore, be necessary to excite the female by electricity or other means. There is also difficulty in obtaining semen. It must be obtained from the vagina after copulation, but as the act lasts an hour or longer and there is a steady stream of the ejaculate toward the ovary, it might not be possible to collect a sample because all has gone forward. This seems to be proved by the fact that when salt solution is injected into the vagina after copulation and immediately withdrawn to serve as the specimen for insemination, it may be found to contain no sperms on microscopic examination. In the face of these obstacles it is difficult to find a method for the artificial insemination of minks. [Wegner, E. E. Dean, College of Veterinary Medicine, State College of Washington. Artificial Insemination of Mink. The Fur Journal, vii (March 1941), pp. 3-4.]

"During the World War, the scarcity of meat resulted in the butchering of many valuable milk goats, and that same condition may prevail again," says the *Goat World*.

A New Chemotherapy for Encephalitis

Sequels of infectious diseases affecting the brain yielded to sodium salicylate in 24 patients. Adults received 5 Gm. daily, in five doses of 1 Gm. each. Smaller doses were given to children. In the case of gastric trouble or in unmanageable children the remedy was given per rectum. Digitalis was given to patients showing irregular pulse or a febrile reaction. In the latter event, vitamin B therapy was found to be helpful.

Singultus (= hiccup) may be the only symptom of encephalitis and it may interfere with the intake of food. The author found sodium salicylate a useful remedy for hiccup. [Sás, J. Chemotherapy of Encephalitis. Wein. Klin. Woch., Vienna, liii (July 1940), p. 541. Abst. J.A.M.A. (March 8, 1941), p. 1032.]

The Sex Hormones and the Endocrine Balance*

The present concept of endocrinology dates back to Claude Bernard's physiological axiom that in higher life the various organs coöperate in such a fashion as to maintain the somatic equilibrium. Bordet, an experimental pathologist, added later that "Life is the maintenance of a balance that is incessantly disturbed."

In studying the endocrines (hormones), physiologists preconize the maintenance of balance while the pathologists are more impressed by its incessant disturbance. the light of the known facts of today, the glands of internal secretion form one system in which the individual glands act with one another to varying degrees. There are synergists and antagonists among them which maintain normal functional activity. When one or more of these glands cause disturbance in one direction, others compensate by inhibiting their overstimulation or its effects. An outstanding example is the stimulating action of the thyroid and adrenal glands on the glycogenic function

^{*}Middleton Goldsmith lecture of the New York Pathological Society, given at the New York Academy of Medicine, October 4, 1940.

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of the liver which the islets of Langerhans (insulin) inhibit. The interrelationship of the anterior pituitary, adrenal cortex and the ovary furnishes additional proof of hormonal coöperation. In fact, when studied alone, the experimental results are curious and puzzling, but considered as a system of organs, the revelations become more comprehensive. The complexity of endocrine physiology and of its unknowns are, however, admitted. Quoting: "The genius of Claude Bernard shines no more brightly than in this bold conception [glycogenesis] which even today in spite of the vast amount of work carried out on the subject, is not always fully understood."

Throughout the lecture the endocrine system is treated as a physiological unit. Hormonal interrelationships are emphasized. The system is complex and its functions delicate. Each gland is governed partly by its antagonists and synergists which take care of hyper- and hypofunction. In pathology these two conditions are becoming increasingly evident. An endocrine disease may involve all or various components of the hormonal system. ideal pathologic examination should, therefore, embrace all of the endocrine glands. The whole subject is compared to the confused heap of pieces of a picture puzzle which science is attempting to put together. [Cramer, W. The Sex Hormones and the Endocrine Balance. Bulletin of the New York Academy of Medicine, xvii (Jan. 1941), Second Series, pp. 3-26.]

Aujeszky's Disease (= Mad Itch) In a Dog

The subject was a Beagle affected with Aujeszky's disease in the gastrointestinal form. The animal presented inappetence and slight diarrhea from the start. In several days the temperature was 40°C. and there was difficulty in swallowing. There was no pruritus or paralysis of the jaw and no particular modification in general appearance. Later, bilious vomiting, spasms of the diaphragm and abundant salivation developed. In nine days the hind limbs were paralyzed, but the animal could still

make feeble attempts to walk. It died a few days later.

Autopsy showed no macroscopic lesions. The urine reduced Fehling's solution. Fragments of the medulla were inoculated into the dura mater of a rabbit. On the third day the rabbit developed the disease in the typical pruritic form and died in the characteristic attitude. The Moroccan strain of Aujeszky's virus, isolated from the rabbit, did not differ from the classical strain. [Remlinger, P., and Bailly, J. Premier cas marocain de la maladie d'Aujeszky. Abst., Bulletin des Services Zootechniques et des Epizooties, iii (July 1940), p. 178.]

With War Dogs Through the Ages

The author gives a detailed account of the part played by war dogs since remote times, in fact, since the days of primitive man. Being protectors of the family, dogs were naturally companions of men who went to war, and they were used in defense and attack as shown by the bas-reliefs and friezes seen in museum collections portraying the military tactics of ancient people. In defense, cordons of dogs guarded the camps and ramparts of besieged towns. Far beyond the Christian era, dogs were armed and armored for combat. Armed with spiked collars and curved knives protruding at all angles, a pack of dogs often wrought panic and confusion to the enemy's cavalry. The bravery of dogs in attack was held out as an example to soldiers.

The coming of gunpowder transformed the use of war dogs to sentry and messenger service and transportation. In these services they participated in a large way in the German, Belgian, Italian and French armies during the World War of the "teen" decade. They fetched food for the French and drew machine guns for the Belgians.

In the British detachments in India, dogs of remarkable type (Baluchi hounds) are attached to every patrol. They take their place with the soldiers when the night patrol is told to retreat to quarters when reveille sounds off in the morning, all in

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the daily grind, automatically without urge or call.

The first-aid dog is cited as useful in hunting out the wounded in places hidden from the vision of the stretcher bearers. In spite of the fine service dogs have rendered in wars, they are not recognized officially in England [nor in the U.S.A.]. [Trew, Cecil G. With War Dogs Through the Ages. The Kennel Gazette, liii (Feb. 1941), pp. 7-9.]

Phosphatase

To what extent and in precisely what manner deficiency diseases cause the skeletal troubles of horses remain obscure. Studies of the calcium-phosphorus ratio have shed vague but not sufficient light on the subject to build up a scientific etiology. The serum enzyme, phosphatase, may be the solution. Its rôle in ossification and bone formation is the hint to study its relation to spavin, ringbone, etc.

The part played by phosphatase in infant rickets has been widely studied, but in domestic animals no work of importance was ever done, at least not in horses, the animal in which clinical skeletal troubles are the most common and the most serious. The researches carried out at the Rowett Research Institute at Aberdeen, Scotland,* on sheep would be a point of departure for these studies. In certain bone diseases, serum phosphatase increases, excessively. The Scotland researches showed that when sheep, experimentally depleted, received cod liver oil and limestone, they did not show any significant increase in phosphatase, while in the controls the serum phosphatase began to rise almost immediately.

Serum phosphatase is measured in units, the Kay unit or the Bodansky unit, both of which are based upon the amount of phosphatase that will liberate 1 mg. of inorganic phosphorus from sodium betaglycerophosphate. The determination is not elaborate and does not require unusual apparatus. Since the test determines vitamin

D deficiency in subclinical cases, it may be useful in the study of bone nutrition in domestic animals. [Editorial. The Utility of Serum Phosphatase in the Study of Vitamin D Deficiency. Vitamin D Digest, ii (Dec. 1940), p. 39.]

Internal Parasites of Poultry

The prevalence of internal parasites in poultry has greatly increased in Illinois during recent years. The increases shown by the percentages of infections found in specimens examined by the department of animal pathology of the state university were 21 per cent for 1921 to 1930, 32 per cent for 1933 and 1934. In some localities farmers believe that it is impossible to raise poultry that are worm-free.

The way parasites survive in the soil, the injury they do, and how the problem should be handled are discussed in an illustrated booklet, entitled "Internal Parasites of Poultry and Common Intermediate Hosts with Directions for Parasite Eradication and Control."

The subject is treated in two general sections: flatworms (flukes and tapeworms) and roundworms (ascarids, capillarids and gapeworms) and under these heads the common worms affecting farm flocks are described with reference to their life history, the trouble they produce, the diagnosis, and the preventive and curative treatment.

While the thesis is quite orthodox, it stands out from the mill run of such booklets in that its text is well illustrated with drawings and photographic reproductions for which such documents of the University of Illinois are noted. As a means of imparting the right kind of information practitioners need in giving an account of themselves in poultry practice, this booklet strikes one as having unusual value. The illustrations of the various worms and their ova are excellent and the epizoölogy (control and prevention) is certainly a reminder of the veterinarian's obligation in turning the climbing percentages of parasite-afflicted farm flocks of that state in the right direction.

A graphic reminder of the complexity

^{*}Auchinachie, D. W., and Emslie, A. R. G. Biochemistry Journal, xxvii (1933), p. 351.

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of the poultry-parasite problem of the farm are the closing pages illustrating the many intermediate hosts concerned: beetles, bugs, flies, snails, slugs, roaches, earthworms, et al, to which the farm flock, living in the great outdoors, is exposed. [Internal Parasites of Poultry. By Robert Graham, chief in animal pathology and hygiene, University of Illinois; J. P. Torrey, formerly assistant animal pathologist, and J. D. Mizelle, assistant animal pathologist, State Department of Agriculture; and Viola M. Michael, first assistant in animal pathology, College of Agriculture, University of Illinois. Circular 469 (undated).]

Swine Practice

Because of the prospect of a good demand, farmers are advised to raise as many (but not more) hogs as they can accommodate and care for. More breeding and curtailing diseases are the means to that end. Losses from diseases in swine run up to the staggering figure of 40 per cent through the hazards to which they are exposed in farrowing, nursing, growing and fattening. These are for the veterinarian to prevent. Ankle-keep dust in yards, insanitary mud holes, and exposure to the hot sun are evils to be corrected. Sprinkling to keep down dust, cement wallows and the straw-cover canopy to provide shade are hygienic measures of the first Though body fat insulates against cold, swine are strangely sensitive to cold drafts. Piling up to avoid drafts in the sleeping quarters is detrimental, and a prolific cause of respiratory troubles. The methods of constructing inexpensive hygienic quarters should be pointed out. "The hog is no more filthy than his owner makes him." Every veterinarian should have a broad knowledge of such matters in order to serve his purpose to the swine-breeding industry.

The big pig crop is the potential sphere of a swine practice. It is, therefore, imperative to understand the principles of reproduction, its details and its pitfalls in regard to parent stock, maternal housing, feeding, preventing injury, handling, and exercise. Avoid the molestation of pregnant sows by other livestock. When abortions occur, think first of these things. When sows get sluggish and take less exercise toward the end of term, cut down the ration and satisfy the appetite by feeding bulkier food (oats, alfalfa).

The author discusses baby-pig ailments, cholera immunization, influenza dysentery, administration of vermifuge capsules, phenothiazine toxicology, anaplasmosis (?), posterior paralysis, agalactia, hernia et al.

Practitioners are warned against making too much ado over cholera vaccination at the expense of the many other places where their professional service is paramount in successful swine production. [Bryant, John B. Swine Practice. Extemporaneous address before the 53rd annual meeting of the Iowa Veterinary Medical Association. The Iowa Veterinarian, xii (March-April 1941), p. 5.]

From 1825 to 1925, the *per capita* consumption of sugar in the United States increased from 10 lb. to 110 lb. It is only in recent years that it has been used abundantly in the human ration.

Retail sales in the United States for 1940 amounted to \$45,500,000,000, or 6 per cent below those of 1939. The national income for 1940 was \$73,800,000,000, which was an increase of \$4,400,000,000 over that of 1939.

Dental decay has a seasonal trend, judging by studies of school children which showed new cavities to be most frequent in late winter and spring.—Science News Letter.

After air raids cats come back and perch on what's left of their homes; dogs run hopelessly about looking for their masters; and therein lies a lesson in animal psychology. The one likes places, the other likes people.

The lungs have a bad reputation as a cause of death in man and animals when, as a matter of fact, they are but the vital organs that "took the rap" from diseases of other organs in which they were not primarily involved.

id

Intramammary Infusions in the Treatment of Chronic Bovine Mastitis

Since the milk cistern and its radiating ducts are the original centers of chronic streptococcic mastitis, and the hotbed of the disease is, therefore, accessible to topical microbicidal treatment, the use of intramammary infusions has been studied extensively during the past 15 years. At the Twelfth International Veterinary Congress (New York, 1934), Prof. W. Steck of Switzerland announced the results he had obtained by the intramammary infusion of various dyes (entozon, rivanol, trypaflavin and others).

In general, the Steck method described consists of infusing a small quantity (250 cc.) of a strong solution into the milk cistern and ducts, massaging the quarter gently, and then milking out the solution. After this preliminary rinse, a larger quantity (1,100 cc.) of a weaker solution is infused and disseminated by massage. Only about one half of the latter infusion is milked out. Of 174 cases thus treated 75 per cent were cured.

Schalm describes the results of a similar investigation he conducted at the California Agricultural Experiment Station. The apparatus and technic employed are described in a previous article (J.A.V.M.A.,July 1940, pp. 20-27). From the four diagnostic tests used, the udders were classified into (1) normal, (2) suspicious, (3) fairly extensive fibrosis, and (4) extensive fibrosis. Where Streptococcus agalactiae, S. uberis, or S. dysgalactiae were isolated, the quarter was considered infected and was treated.

Tests were made of trypaflavin in dilutions of 1:1,400 and 1:10,000 and also of concentrated trypaflavin-sucrose solution. The results given in tables showing dilution, volume used, number of infusions, reactions, sequels (injured quarters) and other details, register the facts about the merits of this dye in the treatment of chronic streptococcic mastitis.

The author's modification of the Steck

method where trypaflavin, 1:1,500 in 20 per cent sucrose, was employed showed that 69 per cent of the quarters infected with *S. agalactiae* were cured by one treatment. The method is time-saving and the hypertonic (20%) sucrose-trypaflavin mixture is not as harsh to the tissues as the plain aqueous solutions. The 1:1,400 trypaflavin solution was found to be too irritating for safety even when left but five minutes in the udder.

Although the 1:10,000 concentration (aqueous) of trypaflavin is efficient in eradicating the streptococci when 800 to 1,200 cc. is infused per quarter and left in for 5 to 15 minutes, a much greater concentration can be used with safety when sucrose is added. Moreover, practically all of the liquid infused can be milked out after five to ten minutes. The results obtained from the sucrose-trypaflavin liquid were 69 per cent of cures from one treatment and 93 per cent from two treatments. [Schalm, O. W. The Use of Trypaflavin in the Infusion Therapy for Streptococcic Mastitis. American Journal of Veterinary Research, ii (Jan. 1941), pp. 117-128.]

Because a hen requires three times more feed to produce as much food as a cow, the dairy industry, on the long run, has that much advantage over egg production.

The Human Guinea Pig

In studies of the minimum nutritional needs of the human being, large populations have become the guinea pigs. Owing to the crises in the food supply of the nations at war, new and important facts are coming to light through the studies of scientists all over the world, including our own.

Facts anent human nutrition based upon large-scale observation, heretofore unheeded, are emerging from World War II. Reinforcing bread with the elements lost in modern milling is but one of many reforms the present war is bringing out.

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Typhoid-Brucella Vaccine

A heat-killed vaccine containing per cubic centimeter 1,000 million each of Bacillus typhosus, Brucella abortus and Brucella melitensis was given to 29 adult persons in doses of 0.5 and 1 cc. at weekly intervals. The reactions were comparable with those following typhoid-paratyphoid vaccination. Most of these subjects (96%) showed serum agglutination for B. typhosus and all of them for Br. abortus. Protective antibodies for B. typhosus were increased from 40 per cent to 83 per cent by the injections, for Br. abortus from 17 per cent to 79 per cent, and for Br. melitensis from 14 per cent to 100 per cent. The vaccination did not appear to produce cutaneous sensitization to brucellergen. The substitution of typhoid-Brucella vaccine for typhoid-paratyphoid vaccine is recommended. [Kolmer, J. A., Bondi, A. Jr., and Rule, Anna A. Results of Active Immunization of Human Beings with a Mixed, Heat-Killed Vaccine of B. typhosus, Br. abortus and Br. melitensis. Journal of Infectious Diseases, lxvii (Nov. 1940), p. 258. Abst. J.A.M.A., (March 8, 1941), p. 1028.]

Leptospirosis (= Weil's Disease)

The authors report an epidemic of Weil's disease (7 cases) in Philadelphia. Of seven young men bathing in a pond probably polluted by rats from a nearby cow stable, all contracted the disease and one of them died. Attention is called to the recognition of the disease in England for the first time in 1922 and in the United States at about the same moment.

Up to 1939, 248 cases were recorded in England and but 23 in the United States. The difference is probably due to recognizing the mild cases (nonicteric), while here only the grave forms with jaundice, hemorrhage of the liver and fever have been recorded. There are (a) mild, subclinical and ambulatory forms, (b) moderately icteric and nonicteric forms, and (c) severe often fatal, forms.

The microörganism (spirochete) is dis. tributed world wide and usually associated with dogs and rats. The canine disease is transmissible to man. The disease has been known in different countries as "harvest fever," "summer influenza," "water fever." "swamp fever," "mud fever," and "sevenday fever." The danger of bathing in polluted water is emphasized. An inference to be drawn from this report is that Weil's disease [as pointed out by Karl F. Meyer*] is obviously quite prevalent in the United States. [Havens, P. W., Bucher, C. J., and Reimann, H. A. Leptospirosis: a Public Health Hazard. J.A.M.A., cxvi (Jan. 25, 1941), pp. 289-291.]

Sulfanilamide in Actinomycosis (Human)

The use of sulfanilamide in three human cases of actinomycosis resulted in apparently complete cures. One case was of the jaw, one of the lungs and thoracic cage, and one of the lower abdominal wall. Iodide of sodium and x-ray were used in conjunction with the sulfanilamide, but in view of the excellent results obtained, the author believes that this drug or a similar one should be included in the treatment of actinomycosis. [Dobson, L., Holman, E., and Cutting, W. Sulfanilamide in the Therapy of Actinomycosis. J.A.M.A., exvi (Jan. 25, 1941), pp. 272-275.]

The conservation of wildlife can be overplayed. The overstocking of wild beasts and birds in certain places may ruin the farmers, according to reports of scientists and executives of wildlife conservation discussed at the North American Wildlife Conference in Memphis, Tenn. The fear that wildlife is soon to disappear and the systematic efforts made to preserve it can cause more headaches per acre than the surplus of corn and cotton, some scientists stated.

^{*}K. F. Meyer et al. Canine Leptospirosis in the United States. J.A.V.M.A., xcv (Dec. 1939), pp. 710-729.

Dogs of the Ancients

The dog has affected the life of man including his religious beliefs since "the beginning of things." Its fidelity toward man is as real as it is old. When the behavior of man displeased his Maker, the beasts of the earth were set apart by a great chasm which was to forever separate man from his animal companions.

But, as a legend teaches, the dog took a mighty leap and landed by man's side, there to remain more faithful than other living creatures. The Indian legend is that God created the dog to protect Adam and Eve. Pliny wrote on canine loyalty, but the dog's fidelity was best expressed by the Egyptians when they saw the life-saving overflow of the Nile come faithfully upon them each year with the appearance of a brilliant star in the heavens. They named the star Sirius-Dog Star-as a symbol of the watchful fidelity for which the dog had remained famous through the centuries. To them the death of a dog was a solemn event the death of a god. In Abyssinia the dog was a king surrounded in the palace with attendants, officers and guards.

The Israelites proclaimed the dog unclean, but evidently admitted the advantage of "having a dog about the house" (Matthew, xv, 27). The Hindus and Islams also considered the dog unclean and believed that the dog would bear witness against them in the hereafter. According to a Greek legend, Pluto charged the dog with the duty of preventing the spirit of the dead from escaping from Hell, and when Christianity replaced Pluto with Satan, the dog was charged with guarding the third circle of the Inferno. Socrates swore by the dog, and the Romans sacrificed dogs so that the gods would not be without their faithful companions. In pre-Christian Rome, lapdogs were so popular that Julius Caesar wanted to know whether the ladies had quit having babies. In China, the sacred dogs were the property of the ruler and they occupied a prominent place in his court. [Trew, Cecil G. Dogs of the Ancients. The American Kennel Gazette, lviii (April 1941), pp. 7-9.]

BOOK NOTICES

Cyclopedic Medical Dictionary

Something new in medical dictionaries is news, since from time out of mind the dictionaries of medical terms have been quite orthodox, differing only in relatively unimportant matters such as spelling, titles, subtitles, derivations, and coverage in the abridged ones. Medical lexicographers have been loathe to impart information that violates the conventions of their art. The notion of elaborating upon a medical term beyond the mere definition in order to further enlighten the casual user was not customary.

Taber's Encyclopedic Medical Dictionary departs from the usual plan by defining between 50,000 and 60,000 words and yet finding sufficient white space to set down the salient facts about the more important terms. For example, under "alkaloid" one finds not only the proper definition, but also a table listing the more important ones in respect to chemical formula, source and "Anaemia" and "anesthesia" each gets three columns. Poisons are listed on a two-page table giving the name, antidote and other treatment. Besides being just defined, the diseases, in their alphabetical places, are described as to their cause, diagnosis and treatment. In short, any term of importance, beyond its mere definition, receives popular treatment without offending the most scientific mind, and needless to add, refreshes the mind on many a detail that is easily forgotten—that would require reference to books (one may not have) on the subject.

The bones, joints, muscles, nerves, veins and arteries (human) are named and described in tables, in the appendix of many pages, along with tabulated material on the calories of practically all foodstuffs, the vitamins and their unit values, the elements, weights and measures, temperature equivalents, medical abbreviations, Latin and Greek prefixes and suffixes, and a glossary of common expressions in five languages. All of these bring into a few pages a wealth

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of information that can not be overestimated. The table of the physical constants of the elements, for example, gives the symbol, valence, specific gravity, atomic number and weight, and boiling and melting points, of the known 93 together with remarks on 94 and 95 which are coming into the list. This table may be pointed out as a sample of the grouped material which overwhelms the memory and yet must frequently be referred to in the study and practice of medicine.

Here is a book to keep at one's elbow. For those who write, it is an indispensable time saver, a book abreast with the age and authentic because its author is a pioneer medical lexicographer, and his associate editors, prominent figures in the field of medical education. Taber's Cyclopedic Medical Dictionary. By Clarence Wilber Taber, author of Dictionary of Foods and Nutrition, Taber's Dietetic Charts, Cumulative Atlas of the Human Body, Dictionary for Nurses, etc., and 15 associates. Imitation leather. 1,500 pages. 273 illustrations. 94 appendixes. Indexed, \$3.00; plain, \$2.50. F. A. Davis Company, Philadelphia, 1940.]

Approved Laboratory Technic

This, the third edition of a manual well known in the field of research and clinical pathology, brings laboratory technic up to date. Although the authors do not speak in the name of the American Society of Clinical Pathologists, the text was approved by five of its members and 24 prominent collaborators.

The book is intended to fulfill the needs of laboratory technicians even down to the small details that experts do not require but which lead to uniformity of methods. The reader is forthwith reminded that modern microscopy and micrometry require, first of all, the use of microscopes of well-known makers. Because of its simplicity, the student type is preferred for routine work. The many veterinarians striving to improve their diagnostic work will appreciate the excellent description of darkfield microscopy and also the newer methods of examining blood which are described

in an illustrated chapter revising the old methods of identifying and counting the figured elements of blood and their parasitic companions.

The chapter on urinalysis takes the reader through physical, chemical and bacteriologic studies of urine and certain interpretations of them that are not generally weighed in our routine procedures, Determining the amount of anterior pituitary hormone in the urine as a means of diagnosing pregnancy (Aschheim-Zondek and Friedman tests) is briefly described as to technic, reliability and causes of failure.

Benbrook's method of preparing feces for worm-egg examinations is given with the graphic illustrations familiar to readers of veterinary literature. Detailed methods of collecting and handling various material for bacteriologic examination completes the introductory chapters of 332 pages. Beyond are chapters on sterilization, culture media, cultivating and staining, diagnostic bacteriology, examining the skin and mucous membranes for parasites, the preparation of vaccines and bacteriophage, and the examination of milk and of water.

In the chapter on testing disinfectants, the official tests of the Food and Drug Administration are given in all essential respects.

The authors' treatment of the agglutination test takes the practitioner of veterinary medicine over familiar ground, and to the physician it stresses the growing importance of differentiating typhoid fever from brucellosis by means of this test. Here, the veterinary profession feels proud of the achievements of Huddleson, Cotton, Buck, Fitch, Haring and others. Huddleson's method of rapid agglutination is set down at length and well illustrated. It is the method of choice.

In describing the agglutination test for glanders in horses and man, complement fixation is rightly given the preference, since [as veterinary scientists agree] the agglutination test fails to detect the chronic cases. The agglutination tests for pullorum disease and fowl typhoid, although but briefly described, are not omitted.

In the 87 pages on the chemical analyses

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of body liquids are descriptions of colorimetric and scopometric methods, several of which are routinely employed by veterinarians. The chemical analysis of blood is treated in a separate chapter and in a fashion rich in information now attracting wide attention in the diagnosis of animal diseases. It includes the modern and simplified tests for calcium, phosphatase, chlorides, cholesterol, globulins, methemoglobin, iron, urea nitrogen, and other components of blood related to morbid processes.

Injuries from the more common poisons and the methods of handling them are given in a separate chapter on toxicology. In the appendix is a well-illustrated article on the examination of semen which takes the reader through ground well cultivated in veterinary practice, particularly in bovine medicine and by those engaged in artificial insemination.

This book is earmarked for a place in every veterinarian's library. It contains many a paragraph of unusual value for those who desire to keep abreast with this age of accurate diagnostic methods. Those who practice microscopy in their daily work will certainly find it indispensable. For the expert it needs no boost; for the beginner, it fulfills every need. [Approved Laboratory Technic, third edition. By John A. Kolmer, M.S., M.D., etc., professor of medicine, Temple University, and Fred Boerner, V.M.D., assistant professor of bacteriology, School of Medicine and Graduate School of Medicine, University of Pennsylvania. Cloth. Illustrated, Pp. 921. D. Appleton-Century Company, New York and London, 1941. Price \$8.00.]

A pound of cheddar (American) cheese made from whole milk represents the protein, fats and sugar of a gallon of milk and is 99 per cent digestible.

Modern processing of food, such as milling, for example, is apt to remove important ingredients that must now be put back to restore food to its primitive values—the values of antiquity when men were said to have lived nearly a thousand years.

Sirius Sentiment Series

The dog star Sirius was so named by the Egyptians because it was faithful—and makes its appearance at precisely the same time every year. Except the dog itself, nothing could be more faithful, the author declares. So why not publish a series of handy cards with this thought as the inspiration?

The cards, 12 of them, of heavy cardboard present sentiments, emotions and wisecracks on man's best friend for the people's edification. The titles are:

- 1) Senator Vest's Tribute to the Dog
- 2) The Dog's Prayer
- 3) My Dog Is Dead
- 4) The Only True Love Money Can Buy
- 5) The Dog's Bill of Rights
- 6) The Old Dog
- 7) How the Dog Was Named
- 8) Why Get a Dog
- 9) Why the World Likes Dogs
- 10) Purgatory of Dogs
- 11) Then Be Not So Cruel
- 12) Don't Call a Man a Dog

This set of cards is useful to refresh the mind, to frame for the small animal hospital waiting room or to pass on to clients. [Sirius Sentiment Series. By Capt. Will Judy, editor of Dog World. Size 4" x 9". Judy Publishing Company, Chicago. Price 10 cents each, set 60 cents, 4 sets or assorted, \$2.00.]

The Anaerobic Bacteria— A Subject Bibliography

The material consists of references on the subject for 1938, 1939 and a part of 1940. The subjects of the articles are grouped under various heads and arranged chronologically with the authors in alphabetical order in each of the groups. The subjects are located by means of a "Subject Index Outline" which classifies the material into such general heads as culture methods, morphology, physiology, metabolism, etc., to name but a few at random. The names of the journals are named in nine pages giving the abbreviations used, the full name

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and the issue in which the article was published.

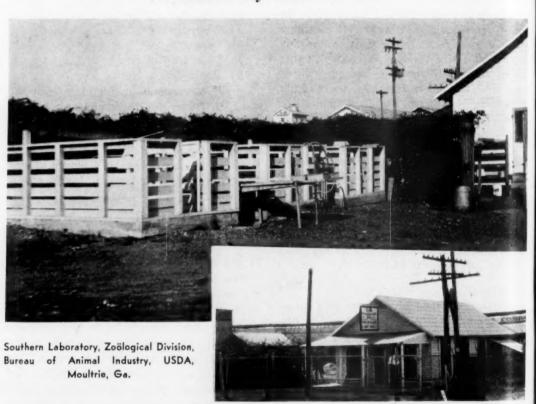
The authors are listed alphabetically in the "Chronological Author Index" where the subjects and journals are again identified. Junior authors are included. The "Subject Index," arranged as above stated, takes up the body of the book—224 pages.

The volume ends with a list of all of the anaerobic species divided into (1) spore-forming, (2) non-spore-forming, and (3) unnamed species. There is a general index to further aid in locating articles on the subject.

Here is a great book, representing a tremendous amount of painstaking work which will be appreciated by laboratory technicians, librarians, clinical pathologists, and writers in search for details on this important class of microörganisms. [The Anaerobic Bacteria—A Subject Bibliography. By L. S. McClung, Indiana University, and Elizabeth McCoy, University of Wisconsin. Cloth. Pp. 266. University of California Press, Berkeley and Los Angeles, 1941. Price not given.]

The fact that for 1939 there was but one case of milk-borne illness per 60,000 people speaks well for the work of veterinary science and sanitary distribution of milk.

A Laboratory Made Famous



This laboratory, now directed by Leonard E. Swanson, won fame in the field of domestic animal helminthology. E. M. Nighbert (retired), R. R. Raffensperger (deceased) and the late Maurice C. Hall worked in and around this forum of research. Its latest achievement was the discovery of the vermicidal properties of phenothiazine.

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Lower Animals and Human Welfare

Celsus (40 B. C.) foresaw that clinical veterinary medicine would find a place in the practice of human medicine. Galen entertained the same thought, yet progress in that regard was slow, although his doctrines were dominant in human medicine through many centuries. It was not until the teachings of Chaveau, Pasteur, Toussaint, Koch, Fleming and others changed folklore to science that knowledge of veterinary science began to be weighed. The question involves (1) animal diseases transmissible to man, (2) the effect of maladies of animals on human welfare, and (3) political aspects.

Professional distinctions are artificial. The bacteria, viruses and parasites that cause disease obey natural laws, regardless of how human methods classify professions. Certainly, the cause of disease is not concerned with the titles M.D., D.V.M. or others which research workers are entitled to use. Of about 50 diseases for which condemnations are made by the federal meat inspection service, six are transmissible to the human being through fresh meat, namely: anthrax, tuberculosis, trichinosis, brucellosis, glanders and tapeworms.

Laymen as well as veterinarians and physicians have been aware of the way certain insects transmit microörganisms, since the original discoveries in this connection were made by the United States Bureau of Animal Industry 50 years ago. Rabies, which affects all warm-blooded beings, is controlled, particularly in island countries, by quarantine. Australia, New Zealand, Tasmania and our own Hawaii have kept out rabies. These are but a few of the many veterinary-medical problems. Physicians and veterinarians now gather together to discuss these problems. The exhibit sponsored by the American Veterinary Medical Association at the New York World's Fair occupied a prominent space in the Hall of Man.

Veterinarians suffered cruel treatment during the past century. The bill before Congress to establish a bureau of animal industry was jeered. As Congressman Hatch, champion of the bill, pointed out, it took courage to become a veterinarian in view of the sneers and loss of social prestige thrown at this occupation. Today there is pride in the honor and the prestige the veterinary profession now enjoys.

The effect of tick eradication upon the welfare of the South is well told. Dipping vats are its "canals to prosperity." Hundreds of dairy herds, milk plants, creameries, ice cream factories, and packing houses exist where cattle ticks once reigned. Behind all this is tick eradication. Moreover, the condemnation of 20 million pounds of meat annually on account of tuberculosis has dropped to a negligible quantity.

The impotence of independent effort to control contagious diseases by states without centralized guidance was first shown in the early attempts to eradicate contagious pleuropneumonia and also in the attempts to maintain foreign trade.

VETERINARY RESEARCH AND PUBLIC HEALTH

In his struggle to maintain supremacy over living things, man has not conquered, but has made notable progress against his deadliest enemy-disease. Man's span of life has been increased from 40 years in 1855 to 58 years at the present time. This is the result of toil in the field of medical science. The reader is taken through the chain of events in bacteriology from the work on anthrax, actinomycosis, fowl cholera, tuberculosis, trypanosomiasis (surra), Texas fever, brucellosis and others which clarified epizoölogy of these plagues. In the field of virus diseases the veterinarian's research work on foot-and-mouth disease, equine encephalomyelitis, canine distemper, swine influenza and equine influenza has been an outstanding contribution to the fund of medical knowledge. The work of Maurice C. Hall on the anthelmintic value of carbon tetrachloride and tetrachlorethylene is cited as a great contribution of veterinary science to public health. While human medicine has given much toward the well being of lower animals, so has research

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in the field of veterinary science given much to the welfare of mankind.

PROGRESS OF VETERINARY MEDICINE

Benjamin Franklin would be happy to know of the achievements of the college he founded. Rightly, the booklet is a reminder that the veterinary profession will always be indebted for the contributions of Huidekoper, Pearson, Marshall, Bemis and others, and of Dean Dick, who was first to extend the matriculation requirement for a veterinary education to two years of college work.

The booklet makes a few minutes of de-

lightful historic reading that is remarkably inspiring. [The Relation of Diseases of Lower Animals to Human Welfare. By John R. Mohler, Raymond A. Kelser and Cassius Way. Addresses delivered at the University of Pennsylvania Bicentennial Conference. Paper. 40 pages. University of Pennsylvania Press. Price 50 cents.]

The Food and Drug Administration has issued a new requirement for the labeling of phenothiazine. Now the label must carry a warning not to use this anthelmintic in sick or debilitated animals without the advice of a veterinarian.



J. S. Koen, swine expert of the U. S. Bureau of Animal Industry, Storm Lake, Iowa, demonstrating postmortem technics on a shoat. Watching Dr. Koen attentively (lower left corner) is Jose Velasquez Q., director of the Veterinary School, Bogota, Colombia, S. A.

EDITORIAL

Abolishing the Canadian Army Veterinary Corps

THOUGHTFUL CIVILIANS leave military matters to military men. Civilian direction is apt to be spurious, apocryphal, absurd. Military science, with full knowledge of plan and picture for its application, the civilian does not have.

However, in the matter of abolishing the veterinary service of a modern army, it seems logical to register a protest. It touches incompleteness of organization, wastefulness, and cruelty to animals. There is no more forbidding example of human brutality than diseases of military animals where no veterinary service exists. The pitiful (and costly) scenes of the Böer War and the first two years of the World War on the western front seem to have been forgotten. Otherwise, the Canadian Army Veterinary Corps would not have been abolished with a wave of the hand.

Not knowing for what purpose Canadian soldiers and officers are being trained nor into what type of organization they are to be thrown, it may seem indiscreet to disagree. But inasmuch as man's duty to his animal possessions and the service which animals render to their keepers are still quite generally underestimated, it is logical to suppose that this action on the part of the Dominion was due to the too general misunderstanding of just what applied veterinary science means to a modern nation, particularly a nation fighting for its very soul. We write this protest at the risk of being told to mind our own business and we take that risk, not only in behalf of our colleagues north of the international boundary, but also on account of the mutual interest in the military operations of this

When the Americans went to France in 1917-1918, they were not permitted to organize an independent operation from July

1917 to August 1918. During these 13 months it was argued (bitterly) that our troops must be parceled out to armies already organized. There were missing departments and services, among them the veterinary service which had developed into one of outstanding significance along the deadlocked front. The absence of an American veterinary corps and of competent regulations under which one could be formed soon enough to be useful were pointed out by Clemenceau, Haig, Foch, Frey and others as sufficient reason for scattering our troops along the 360-mile front where our animals could be properly handled by the French and British. It was contended and emphasized that without a veterinary service our troops would be a menace to both the military and civilian populations. It is not fiction that until a veterinary corps was organized there was no independent AEF in France. The high command forbade. The forming of the First Army, AEF, corresponds to the time our veterinary corps was organized and ready for action. As a matter of fact, a military force on foreign soil without a veterinary corps is not welcome even by allies. It is a menace, a relict.

Moreover, even a civilian has the right to reason that the integration of an efficient military force rests upon meticulous attention to details. No part can be omitted without risks that war departments do not now take. So, the Dominion veterinarians who are urging the reëstablishment of their veterinary corps stand upon solid ground. As the editor of a Canadian veterinary journal* states, there was never a war when such a service was not needed, and he

^{*}Editorial. Why No C. A. V. C.? Veterinary Digest, iii (Feb. 1941) pp. 49-50.

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further declares that a veterinary corps is needed right now.

The order to abolish the Canadian Veterinary Corps, dated November 1, 1940, must have been issued without giving a thought to the need of veterinary officers to inspect food at the training camps, to take care of the animals that even a mechanized army in training requires, and in addition to serve as a nucleus of a veterinary service that any military force will need forthwith when called to action for an independent operation. It is wishful thinking that allies will fill this gap. Or, do the Dominion commanders expect to pick such a service from the clouds and throw it in at a moment's notice?

If economy is the motive, here is a branch of military service that more than justifies itself every day at every turn, whether engaged in maintaining transportation, salvaging animals or inspecting the food of the soldiers. The payroll is trivial in comparison with the money saved and wastage prevented. While the arms are destroying property galore, the veterinary service is helping to balance the budget. So, if this corps was lopped off arbitrarily as a great stroke of economy, the action would probably be rescinded were all of the facts studied and weighed and the possible results predicted.

The Dominion of Canada is the cradle of veterinary science and education on a continent now girding for its defense. It has a personnel of veterinary scientists, technicians, educators, and clinicians whose judgment the world does not question. Were the Dominion war department to go into a huddle with these, there would certainly emerge a reconsideration of this unwise departure.

Just when, where and what diseases of man and animals will step in and put the finishing touches on the tragedies of the war is problematical, but that something of the sort is likely to happen is predictable. With disease held in reserve, Mars chuckles at the relative impotence of tanks and bombs.

How War May Affect Us

CANADIAN veterinarians are passing resolutions deploring the abolishment of the veterinary corps on the ground that veterinarians are needed in the military forces as food inspectors as well as to care for the health of such animals as the army may need. The United States is pointed out as an example of a country that is expanding its military veterinary service.

From France comes a letter from a young graduate of Alfort, practicing in German-occupied territory, who says he is "very busy" since every precaution is being taken to protect farm animals of every species.

From Germany comes news that the military veterinary service is comparable with that of the World War of the teen decade and, moreover, a veterinarian occupies a prominent place in Herr Hitler's cabinet to look after the operations of the civilian service.

From Britain comes the sad news that veterinarians of the cities are placed on the "Schedule of Reserved Occupations," often assigned to work entirely foreign to their training.

A practitioner² in that predicament writes: "My work could be done quite easily and efficiently by a woman.... When this Great War to Save Civilization is over I can not think that I shall feel able to raise any personal enthusiasm or command rapt attention in telling of the hundreds of beautiful dogs I have shot or the miserable wrecks I have helped to keep alive. If I could myself safeguard in a small way the nation's food supply I might be compensated in some measure for the thrill of hoping to fly a Spitfire or Hurricane."

The national veterinary medical association is being heard in Parliament where there is being aired the obvious mistake of placing trained veterinarians on the schedule of reserved occupations instead of using their science and their art to the best ad-

Personal correspondence received via North

^{*}Leaver, Eric A., Reservation of the Profession. The Veterinary Record, xlv (Nov. 9, 1940), pp. 793-794.

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vantage-the preservation of health in livestock.

The rationing of animals is carefully watched. Each species has its quota even down to the backyard poultry. Nonagricultural animals must be registered for rationing either with the county agricultural committee or urban office.

The British Veterinary Corps Extended

CONTRARY to the apprehension that the Royal Army Veterinary Corps might be abolished on account of the mechanization which has overtaken military organization, this service of the British army is now charged with the functions and duties of the remount service. Special Army Orders of January 8, 1941, amalgamated the remount service with the veterinary service and thereby established the pattern which must sooner or later be followed in the handling of military animals. The two services are no longer as separable as was once believed. As stated in The Veterinary Record, "It is a source of deep gratification that its (veterinary corps) functions have now become so notably enlarged that the previous duplication of duties now become unified under its immediate control."

The Danger of Misconstruing "Eradication"

THE PUBLICITY that has been given to bovine tuberculosis eradication during the last few months nowhere takes into account the continuous vigilance that will be required to maintain the status achieved by the 23 years of effort. Without checking and rechecking and eliminating the few reactors found, the job, sooner or later, would have to be done over. Contagious disease is just that way. It smolders, but is never entirely extinguished. In the case of bovine tuberculosis, it would be a mistake to create the impression that it has been completely exterminated.

The same fact applies to all of the other infectious diseases the veterinary service

has kept under control or out of the country. A few years of *laissez faire* would unleash the infection with all of its former dynamics.

Defense Measures

THE PREPARATION for national defense embraces (1) adequate supply of food of the right sort and of insured wholesomeness, (2) the hazards of mobilizing large groups and furnishing them sanitary surroundings, and (3) the effect these have on civilian life and work. And, besides, as health authorities have often repeated, there is a health problem for the whole Western Hemisphere to be considered.

The veterinary profession's part in all of this lies in keeping the incidence of animal diseases down to a low level and, if possible, cultivating an understanding of that phase of national defense among the people. Attempts to gear up animal production without a corresponding increase of a competent veterinary service would have obvious repercussions.

While great ado is being made over the importance of a balanced diet in national defense, little is said about abundance—about the prospect of trying to balance something one does not have.

At the Illinois Conference on Public Health* Prof. J. E. Becker of Johns Hopkins University stated, "We look to an epoch of national defense as an opportunity to make America strong by making Americans stronger. . . . Good nutrition is one of the agencies that makes for physical preparedness."

About 35 ingredients make up an adequate diet, Prof. Becker pointed out. Ten of these are proteins, 13 are minerals and 10 are vitamins, and the rest are the carbohydrates and fats as sources of calories. The absence of any one of these dietary essentials leads ultimately to specific deficiency disease, and therein lies the significance of a sufficient animal industry.

^{*}Springfield, Ill., December 5, 1940.

Community Sales

SINCE THE DAYS of the drovers who brought livestock to market over the highways through the period of railway development and the establishment of great stock yards, no more difficult problem in animal-disease control has come upon the veterinary service than the one created by the community sale and its confederate, the motor truck. As a magnificent scheme for spreading disease among livestock, the community sales barn has no counterpart, even when conducted under strict supervision of the regulatory officials. Bringing livestock to a common center from hither and you and scattering them to as many farms as each sale has buyers is livestock sanitation operating in reverse gear, despite the greatest care taken to insure the health of the animals sold. To capable veterinarians who know all of the answers, these facts need no emphasis; to the public they can not be too often repeated.

The original intent of the community It had a place in sale was a noble one. Farmers of a agricultural marketing. given community could bring in their surplus stock, farm machinery, household furniture and other odds and ends and sell them for cash which could not be easily obtained otherwise. Although in their simplest form such sales were occasionally used to dispose of diseased animals, the harm done was limited by the honesty of most of the consignors and the caveat emptor urge acceptable in trading livestock. The early community sale was a thrilling, fascinating, gambling, bargain counter with a practical side, a social side and an economic side of no mean value to any community.

But the community sales of the moment, that is, many of them, are birds of another feather. Often the animals put up at auction with all the shenanigan of auctioneering belong to the managers who in financing their purchase and their transportation to the auction ring have despoiled the original purpose of the community sale

to no good end. Many community sales have become a scalper's paradise where animals are bought and whisked off to the next town. The other day, down in eastern Ohio, where hog cholera was unknown to the oldest inhabitants, a truckman carting a load of shoats to a nearby sales barn threw a sick pig into the ditch, obviously in fear of an unfavorable veterinary inspection on arrival. A farmer's wife picked up "the poor thing," hoping to nurse it back to health. Results: Two weeks later 18 fine Hampshire hogs almost ready to market and two brood sows came down with cholera. The mortality was 100 per cent and no redress. The pig had been purchased at a sales barn in an adjacent county by a scalper.

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As Successful Farming has recently said, "Where honest managers operate [sales barns], farmers swear by their community auction rather than at it."

Secretary of Agriculture Thornburg of Iowa has pointed out the evils of the community sales barn in that state in regard to the spreading of disease. He recommends that records of the origin and ownership of all consignments be kept, that managers be licensed and bonded and that sanitary regulations be rigidly enforced.

The fact that the number of sales barns is increasing and is apt to go on increasing is the reason for drawing attention to this difficult veterinary problem. United States Live Stock Sanitary Association has been tackling the problem for several years and some states have succeeded to a considerable extent in regulating the health side of the situation, but the fact remains that the sales barn as a marketing project is wrong in principle from the standpoint of livestock sanitation. Where the managers are simply speculators, it is an abomination of the first rank and in no degree as useful as the shipping associations which the community auctions are replacing.

American Foundation of Animal Health Issues a Popular Release

NATIONWIDE ATTENTION was given to a release of the American Foundation of Animal Health pointing out the depletion of the world's supply of domestic animals brought about by the war. It emphasized the importance of conserving animals in this country through the operations of a competent veterinary service. The employment of qualified veterinarians by farmers was recommended.

Arousing public interest in man's dependence upon an abundant animal industry, which the Foundation set out to do several years ago, is yielding fruit. Through the educational and factual character of these releases, the public has become more and more domestic-animal-conscious and this, we believe, is fundamental in the present preparedness program.

No nation amply supplied with domestic animals is apt to lose a war as long as this source of national security holds out and. conversely, no country at war can long endure a declining animal population. So, bringing these facts to the attention of a public serenely unaware of them is patriotism of the practical sort. In times of peace, the loss of animal strength by disease is too widely diffused to arouse an entire population. It is seen only in market fluctuations, which do not register on the public mind. In this respect, animal diseases are comparable to erosion of the soil, which saps billions from the public purse without melancholic effect. Animal diseases differ, however, in the swiftness by which animal shortage can bring regrets.

To those working among animals and for animal production, like the Foundation and the veterinary profession, conservation is a tradition kept alive by an instinct brought down from the animal plagues of antiquity to the present hour and by knowledge of the disease potential. Veterinary science is not new; it has kept abreast in the march of time. Strangely, however, the significance of its full and proper application was

never brought into the foreground of a national tableau until Hitler, the artisan, chose a distinguished veterinarian for a place in his cabinet in preparing for the present conflict. Perhaps that lesson will teach the nations of the future that man's place in the sun is subordinate to the domestic animals his wisdom enables him to possess.

More Nourishment on Less Food

Secretary of Agriculture Wickard has drawn attention to the fact, well known among those who know food, that if as much ingenuity were used to produce better food as is used in producing more food, there would be less want in the midst of plenty.

Undernourishment in the midst of plenty is a challenge to human ingenuity, and moreover, the reports that many more young men are rejected as unfit for military service now than there were 22 years ago is a sign of drifting in the wrong direction from some cause that may not be far removed from the quality of food we are producing and eating so lavishly.

Science with the aid of practical men in the political circle has a great problem to solve—the problem of preventing physical decline of a large population through dietary deficiencies.

There is quite general agreement among high school instructors on physical education that the rising generation lacks leg, back and shoulder development. While boys and girls are growing taller and bigger, they are also growing softer. Cause: lack of work (chores, as they say on the farm) and the growing habit of riding even short distances in automobiles.

Owing to the corn-loan program, the price of corn has been too high relative to that of hogs, but says the BAE, the corn-hog ratio promises to be more favorable to swine breeders throughout 1941.

THE NEWS

AVMA Activities

Veterinarians in National Defense: Senate Tables Group-Deferment Proposal

As a follow-up to the information presented in the April issue of the JOURNAL (pp. 344-346) about proposed legislation which would defer compulsory military service for groups in the medical, dental and veterinary fields: An Associated Press dispatch from Washington, D. C., under date of April 18, quoted an attaché of the Senate Committee on Military Affairs to the effect that the Committee had unanimously tabled the bill. This action which was more or less expected because of the opposition of army and navy officials to the Murray Bill (S. 783), apparently closes the approach to blanket deferment of any occupational groups, at least for the time being.

However, as was brought out at the hearing by officials of the Selective Service System, the regulations of the Selective Service Act already provide a basis for deferment so that a registrant shall be placed in class II-A if the registrant is found by the local board to be a necessary man in any industry, business employment, agricultural pursuit, governmental service, or any other service or endeavor or in training or preparation therefor, the maintenance of which is necessary to the national health, safety, or interest. Local boards are expected to give proper weight to this provision in dealing with the claims for occupational deferment of necessary men engaged in training or preparation for activities necessary to the national health, safety or interest.

Students or other registrants undergoing instruction may be deferred in class II-A by the local board where the activity for which the registrant is in training or preparation is one essential to the national health, safety or interest, and the registrant is found to be a necessary man.

The period of deferment in class II-A may not exceed six months, but such deferment may be renewed from time to time if the local board finds that such continuance is justified under the regulations.

In determining whether or not a student is a necessary man within the provisions of paragraph 351, the local board should give due consideration to such factors as the length of time the student has been pursuing the course in question, his relative progress and standing in such course, and his relative chances for employment or placement in the activity for which he is preparing.

It would seem, therefore, that veterinary students who may be subject to the draft prior to graduation have an approach to possible deferment by presenting proper credentials as to scholastic rating from their respective deans to their local draft boards. Such credentials could be suitably accompanied by copies of the statement presented by President Wight to the Senate Committee on Military Affairs (see April Journal, p. 345) together with copies of a memorandum from the Selective Service officials relating to deferment of certain essential persons as noted above.

The AVMA office has prepared copies of the material mentioned and will be glad to supply any reasonable number upon request.

Proposed Amendments to the Administrative By-Laws*

Proposal 1

Add a new paragraph to section 3 of article VIII to read:

"a) Vacancies occurring on the Executive Board for any reason, during the term for which the member was duly elected, shall be filled by appointment to be made by the president. The appointee shall serve out the unexpired term of the member whose office he is appointed to fill."

Comment: Although this power is presumably conferred upon the president under his duties as outlined in article II, section 3, paragraph c, of the by-laws, it is probably desirable that this specific provision be made.

Proposal 2

Add a new section to article VIII to read: "Section 7.—No member of the Executive

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^{*}These proposals have been suggested for consideration by the Executive Board and House of Representatives at the Indianapolis session, in order to correct certain minor flaws in the revision adopted last year, and are made in accordance with section 3, article XIII of the by-laws.

Board shall be eligible to serve as a delegate or alternate to the House of Representatives."

Comment: This provision was in the old constitution and by-laws but was apparently overlooked in drawing up the new one.

Proposal 3

If the foregoing is adopted, it is suggested that a similar provision be added to article IX; add a new paragraph to section 3 as follows:

"c) No member of the Executive Board shall be elected or designated to serve as a delegate or alternate."

Comment: This repetition may be unnecessary but is considered desirable.

Proposal 4

Amend article VI by adding another section to read:

"Section 6.—A vacancy created in the office of treasurer by any cause shall be filled promptly by the Board of Governors, the appointment being made for the unexpired term."

Comment: Provision for replacement of every vital association officer has been made except in the instance of the treasurer. This amendment is aimed to correct this lack.

Proposal 5

Amend paragraph b of section 2, article X so that the next to the last sentence will read: "Objections to an applicant's election shall be subject to review and action by the Executive Board, and decisions thereon shall be contained in the report of the Board to the House of Representatives."

Also, delete the last sentence in this para-

Comment: The two sentences as they now stand are ambiguous.

Proposal 6

Amend paragraph a under "Committee on Program" of section 1 of article-XII to read as follows:

"a) Personnel.—This committee shall consist of the chairmen and secretaries of the regular sections, and the executive secretary, who shall act as chairman."

Comment: In adopting the newly-revised constitution and administrative by-laws at the Washington session, a proposal was approved to set up a "Scientific Council" (see section 3 of article XIV), which comprises the section officers and charges them with the identical duties of the Committee on Program. It is desirable, therefore, to abolish either the Committee on Program or the Scientific Council in order to avoid confliction.

It is suggested that the Committee on Program be retained and broadened in membership as indicated and that the term "Scientific Council" be dropped as unnecessary.

Proposal 7

If proposal 6 is approved, section 3 of article XIV should be changed to read:

"Section 3.—The officers of the regular sections shall serve as the Committee on Program as provided in article XII."

Proposal 8

Add sections 4 and 5 to article XIV as follows:

"Section 4.—Papers Read by Title: No paper shall be published as having been read before a section unless it has actually been read, or unless the section shall vote to have it read by title."

"Section 5.—Property of Papers: All papers and reports of any nature presented to the Association, or to any section, shall be the property of the Association, if approved for publication in the Association journals. Prior publication elsewhere of any such papers or reports, or official abstracts thereof, shall not be made except by consent of the Board of Governors."

Proposal 9

Change section 3 of article XVII to read as follows:

"Section 3.—The Board of Governors shall serve as the Committee on JOURNAL, acting in the capacity of a managing editor."

Alumni Luncheons at Indianapolis Convention Planned for August 14

Chairman J. L. Axby of the Committee on Local Arrangements has announced tentative plans for holding the alumni sessions of the 78th annual meeting on August 14. As a departure from the schedule of recent years,



Murat Theater and Shrine Temple, headquarters of the 78th annual meeting.

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luncheons will supplant the customary dinner meetings.

Indiana, Terre Haute and Ohio State graduates will meet at the Severin Hotel. Warren Hotel will be host to Ontario, McGill, Cincinnati, Grand Rapids and San Francisco graduates. Pennsylvania and Cornell will convene at the Washington Hotel. Kansas State, Kansas City, St. Joseph and Texas will gather at the Lincoln Hotel, and Iowa, Michigan, Colorado, Washington State, George Washington, United States C. V. S., Alabama and New York-American will hold forth at the Claypool Hotel.

CONVENTION HEADQUARTERS AT MURAT TEMPLE

In deciding to move the 1941 meeting away from a hotel headquarters to the Murat Theater and Shrine Temple, the Association acted on a careful evaluation of the specific advantages offered by the latter for business sessions and social functions.

Murat Temple is a building of exceptional beauty both inside and out, and it is conveniently located within walking distance from all of the 37 recognized hotels in Indianapolis.

The exhibit hall will open off from the Temple's elaborately appointed foyer. This hall is roomy, well lighted, and should present a background in harmony with the many brightly colored commercial displays, as well as the educational exhibits. Adjoining the exhibit hall is the theater, where the opening ceremony general sessions and meetings of the House of Representatives will be held.

Advisory Scientific Council Confers on Dog-Food-Testing Program

The photograph reproduced below was taken at the Stevens Hotel in Chicago, April 14, dur. ing a meeting of the Advisory Scientific Council to the Committee on Foods, American Animal Hospital Association, prior to the sessions of the Federation of American Societies for Ex. perimental Biology. The Council discussed the technical and control phases of the dog-foodtesting program conducted cooperatively by the AAHA and the AVMA.

With the steadily widening recognition and acceptance of the "seal of approval" program, the work of this council-all of whom are authorities in the field of biochemistry and nutrition-is gaining significance from both the scientific and humanitarian viewpoints. It has been pointed out on several occasions that the impartial guidance and advice rendered by this body is in large part responsible for the growing importance of the testing program, not the least effect of which, a recent Chicago press dispatch signalized, has been to encourage the pet-owning public to distinguish between commercial dog foods that are nutritious and those that may be relatively worthless.



ADVISORY SCIENTIFIC COUNCIL TO THE COMMITTEE ON FOODS, AMERICAN ANIMAL HOSPITAL ASSOCIATION

Left to right: R. Adams Dutcher, professor of agricultural and biological chemistry, Pennsylvania State College; H. H. Mitchell, professor of animal nutrition, University of Illinois; Walter C. Russell, professor of agricultural biochemistry, Rutgers University; Agnes Fay Morgan, professor of nutrition. University of California. (Absentee: George R. Cowgill, professor of physiological chemistry, School of Medicine, Yale University.)

APPLICATIONS

First Listing*

ARMSTRONG, FERNANDO E.

Kansas State College, Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

ARMSTRONG, GEORGE R.

Gastonia, N. C.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

ATKINSON, LEROY N.

1927 N. Ash St., Hutchinson, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

R.R. No. 3, Pittsburg, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

910 N. Capitol Ave., Indianapolis, Ind.

D.V.M., Indiana Veterinary College, 1917.

Vouchers: Charles C. Dobson and Walter K.

BETTS, JAMES G.

Randall, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

BOLES. EVAN E.

207 S. High St., Warsaw, Ind.

D.V.M., Indiana Veterinary College, 1913.

Vouchers: Edgar D. Wright and F. C. Tucker.

BOWERMAN, W. D.

2535 N.W. 19, Oklahoma City, Okla.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

BRIELMAN, EUGENE O.

21 Britton St., Pittsfield, Mass.

D.V.M., Chicago Veterinary College, 1917.

Vouchers: H. E. Dapson and H. W. Jakeman.

BROWER, ARTHUR W.

311 W. 8th, Emporia, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

BRUCE, KENNETH L.

Orchard, Neb.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

BUSBY. BERNARD

Wakefield, Neb.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

CARL. GILBERT W.

201 E. 12th St., Hutchinson, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

CHAMBERS, EDWARD ELDRIDGE

1415 Washington, Parsons, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

CLARK. ROBERT H.

R.R. 1. Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

COLLINS, CLARK C.

442 N. Main St., West Point, Neb.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

COMPTE, JUAN

P. O. Box No. 1337, Havana, Cuba.

University of Havana, Havana, Cuba.

Vouchers: Tomas A. Terry and Bernardo J. Crespo.

DAVIS, SHIRLEY L.

Route 3, Fort Scott, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

DEDRICK, WARREN JAMES

3244 Everett Ave., Kansas City, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

DROLET, BERNARD J.

109 N. 6th St., Newark, N. J.

V.M.D., University of Pennsylvania, 1915.

Vouchers: John J. Devine and J. G. Hardenbergh.

DUNCAN, GLENN

St. Francis, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

EBERHART, GEORGE W.

511 N. 14th St., Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

ERICKSON, JOHN ERNEST

Box 21, Wilson Station, Clairton, Pa.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra,

EYESTONE, HAL

1002 S. Catalpa, Pittsburg, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

FAUSSET, J. K.

Spiceland, Ind.

D.V.M., Indiana Veterinary College, 1917.

Vouchers: J. C. Schoenlaub and C. J. Hufty.

FLIPSE, FRANK

Oakley, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

^{*}See January 1941 issue, page 88.

FRICKERS, J.

Groote Hofstraat 7b Paramaribo, Suriname,

University of Utrecht, Holland, 1927.

Vouchers: John R. Mohler and Adolph Eichhorn.

GISH. JOHN

319 S. Main, El Dorado, Kan. D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

HALVER, GLENN C.

Crane, Mont.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

HOWELL, GORDON

R.R. No. 1, Kansas City, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

HOWELL, H. W.

Rt. No. 1, Kansas City, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

IMMENSCHUH, R. D.

Kansas State College, Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

JONES, CHARLES F.

R.F.D. No. 3, Lisbon, N. Y.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

KADETS, MARTIN

29 Oak Knoll Rd., Natick, Mass.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

KARNES, JACOB L.

Benton, Ky.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

KELLER, EDWARD J.

St. Francis, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

KELLEY, VIRGIL R.

3271/2 South "D" St., Arkansas City, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

KOGER, R. B.

Robbins Ranch, Belvidere, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

LAIRD, G. W.

4000 E. 68 Terrace, Kansas City, Mo.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

LEMEN, CLIFFORD A.

Veterinary Research Laboratory, Manhattan,

Kan

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

LICHLYTER, FRANK E.

610 Cave Springs, El Dorado, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra

LYNN, E. M.

8216 So. Wabash Ave., Chicago, Ill.

D.V.M., Chicago Veterinary College, 1914.

Vouchers: L. A. Merillat and J. G. Hardenbergh.

McMahan, Keith

1401 N. 10th St., Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

McPeek, Raymond Charles

31 Main St., Ramsey, N. J.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

MANLEY, DAVID O.

Wakarusa, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

MEDARIS, JACK L.

1520 Crawford, Parsons, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

MERIWEATHER, HERBERT

1001 Osage, Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

MUNDELL, EARL

1876 Tennyson St., Kansas City, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

NEWHART, CHARLES C.

Kansas State College, Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

PAULSEN, CECIL

1429 Laramie St., Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

PAYNE, LOYAL COBB

Route One, Manhattan, Kan.

D.V.M., Kansas State College, 1941. Vouchers: Edwin J. Frick and R. R. Dykstra.

Vouchers. Edwin J. Frick and R. R. Dykst

PIERCE, LEROY ALBERT

712 Laramie St., Manhattan, Kan. D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

PORT, RODNEY I.

Sundance, Wyo.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

PRATHER, ELWIN R.

Eureka, Kan.

D.V.M., Kansas State College, 1941.

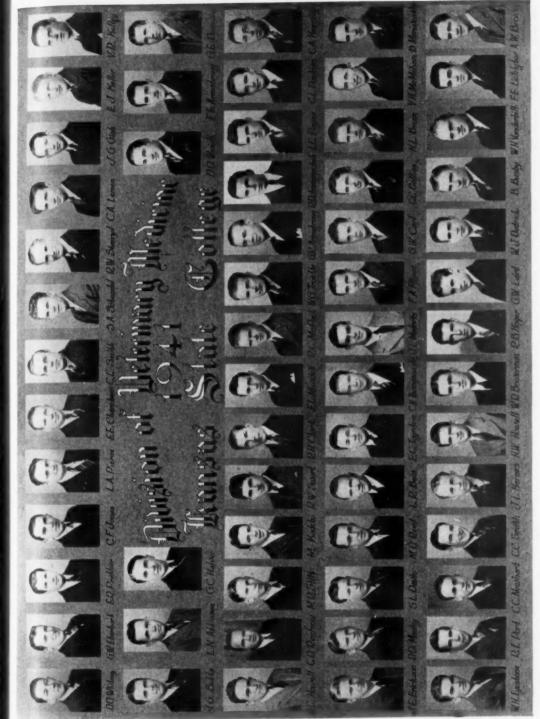
Vouchers: Edwin J. Frick and R. R. Dykstra.

REED, MYRON D.

Smith Center, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.



Sixty-One members, class of '41, Division of Veterinary Medicine, Kansas State College, are all listed as applicants for membership in this issue.

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RENFROW, CHARLES

West Plains, Mo.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

SCHENDEL, SAMUEL A.

Richmond, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

SMITH, CHARLES COMBIE

858-22nd St., Santa Monica, Calif.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

SMITH, CHAS. L.

R.F.D. No. 1, Harveyville, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

SMOTHERMAN, W. M.

P. O. Box 45, Huntsville, Texas.

D.V.M., Southwestern Veterinary College, 1914.

Vouchers: H. L. Van Volkenberg and H. Schmidt.

STANZEL, RAYMOND W.

La Harpe, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

STITT. MARVIN

Clearwater, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

SWAIM, A. A.

c/o Wilson & Co., 4100 S. Ashland Ave., Chi-

cago, Ill.

M.D.V., McKillip Veterinary College, 1909. Vouchers: H. E. Kingman, Jr., and R. F.

Vermilya.

SWART, R. W.

515 Thurston St., Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

THOMPSON, CLARENCE H. JR.

R.F.D. No. 2, Ozawkie, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

TOYNTON, CLAIR

1001 Osage, Manhattan, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

TROSTLE, W. GERALD

Hope, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

TRUNDY, EDWARD L.

2 Bridge St., Augusta, Maine.

D.V.M., Alabama Polytechnic Institute, 1940. Vouchers: Bert J. Cady and M. E. Maddocks.

VANDERBILT, WM.

Eureka, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

WENDT, DELBERT O.

Bonner Springs, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

1126 Bluemont, Phillipsburg, Kan.

D.V.M., Kansas State College, 1941.

Vouchers: Edwin J. Frick and R. R. Dykstra.

WILLICK, E. A.

c/o Burns & Co., Regina, Saskatchewan.

B.V.Sc., Ontario Veterinary College, 1933.

Vouchers: J. E. Horsland and Harland Roy Potter.

Second Listing

Billhymer, W. V., Arcadia, Ind.

Blamey, F. W., 328 Colorado Ave., Pueblo, Colo. Carter, Philip Ray, Veterinary Station Hospi

tal, Fort Snelling, Minn.

Darby, Charles Willis, 159½ Durand St., East Lansing, Mich.

Downey, H. A., 1616 N. Morrison St., Appleton, Wis.

Hardy, L. V., 586 Carlyle Pl., Union, N. J.

Keithly, Arthur G., Walden, Colo.

Lange, A. W., 201 W. Devon St., Milwaukee, Wis.

Mangus, Don E., 316 S. Meridian St., Port-

land, Ind. Mercer, Robert, 225 W. McClellan St., Flint.

Schlosser, Daniel B., 531 W. Linden Ave., Logansport, Ind.

Shannon, L. D., Box 522, Rhinelander, Wis.

*Stone, Earle C., 336 Midwood St., Brooklyn, N. Y.

Tamoglia, T. W., 137 Ross St., White Hall, Ill.

U. S. GOVERNMENT

Army Veterinary Service

Regular Army.—Announcement is made of the appointment of Capt. William Edward Bills, Veterinary Corps Reserve, as first lieutenant, Veterinary Corps, Regular Army, effective March 22, 1941. He is assigned to Edgewood Arsenal, Md., and will proceed from Fort Robinson, Neb., to that station and report for duty.

Announcement is made of the temporary promotion of the following named captains to the grade of major, to rank from March 10, 1941:

Arvo T. Thompson, March Field, Calif. Harvie R. Ellis, Fort Bliss, Texas.

Ralph W. Mohri, Panama Canal department. Austin T. Getz, Fort Clark, Texas.

Wesley W. Bertz, Philippine department. Edgerton L. Watson, Indiantown Gap, Pa. George T. Price, Fort Bragg, N. C.

Lieutenant Colonel George L. Caldwell is re-

^{*}Graduated from New York State Veterinary College at New York University in 1922. Listed in error (April 1941 issue, p. 347), as a graduate of Cornell University.

lieved from his present assignment and duty at Fort Riley, Kan., and is assigned to duty with the staff and faculty at The Cavalry School, Fort Riley, Kan.

Lieutenant Colonel Forest L. Holycross is relieved from assignment and duty at Fort McClellan, Ala., and will proceed to Charleston, S. Car., and sail on transport scheduled to leave that port on or about June 9, 1941, for duty in the Hawaiian department.

Colonel Jacob E. Behney is relieved from his present assignment and duty at Fort Riley, Kan., effective at such time as will enable him to proceed to New York, N. Y., and sail on transport scheduled to leave that port on or about May 22, 1941, for the Panama Canal department and, upon arrival, will report to the commanding general for assignment to duty with the Veterinary Corps.

Lieutenant Colonel Claude F. Cox is assigned to Fort McClellan, Ala., for duty upon completion of his present tour of foreign service in the Hawaiian department.

Lieutenant Colonel Allen C. Wight is assigned to Fort Ord, Calif., upon completion of his present tour of foreign service in the Panama Canal department.

Veterinary Corps Reserve.—The following veterinary reserve officers (first lieutenants unless otherwise specified) have been ordered to extended active duty by the War Department during the month of March and assigned to stations indicated:

Lieutenant Colonel Paul C. Kucher, Fort Bliss, Texas.

Terry Sam Ozier, Army Medical Center, Washington, D. C.

John W. Taylor, South Central Remount Area, San Angelo, Texas.

Raymond B. Gochenour, Langley Field, Va. William W. McMichael, McChord Field, Wash. Benjamin B. Loveland, New York Port of Embarkation, Brooklyn, N. Y.

Walter R. Anderson, St. Louis Medical Depot, St. Louis Mo.

Fred D. Maurer, Front Royal Quartermaster Depot, Front Royal, Va.

Donald Kingston Theophilus, Front Royal Quartermaster Depot, Front Royal, Va.

First Lieutenant Hilding M. Marlowe is relieved from assignment and duty at the Presidio of Monterey, Calif., effective on or about March 5, 1941, and is assigned to duty at Camp San Luis Obispo, Calif.

First Lieutenant Philip R. Carter is relieved from assignment and duty at Fort Snelling, Minn., effective on or about March 20, 1941, and is assigned to duty at the Army Medical Center, Washington, D. C.

Announcement is made of the promotion of the following officers now on active duty:

To Lieutenant Colonel (temporary): Major

Ray S. Youmans, March 13, 1941; Major George S. Mechling, March 25, 1941.

To Major (temporary): Captain Thomas A. Ward, March 19, 1941; Captain William H. Shannon, March 27, 1941.

To Captain: First Lieutenant William E. Eggert, Jr., March 18, 1941; First Lieutenant Sol G. Stephan, March 21, 1941; First Lieutenant Gerald W. Holmberg, March 24, 1941.

Captain John C. Johnson is relieved from his present assignment and duty at Fort Riley, Kan., and is assigned to duty with the staff and faculty at the Cavalry School, Fort Riley, Kan.

First Lieutenant Ralph A. Maxwell is relieved from assignment and duty at Camp Upton, N. Y., and is assigned to duty at Pine Camp, N. Y., and will proceed to that station and report for duty.

Captain Donald R. Morgan is relieved from his present assignment and duty at the Presidio of San Francisco, Calif., effective at such time as will enable him to sail from San Francisco, Calif., on the transport scheduled to leave that port on or about July 12, 1941, for the Philippine department and, upon arrival, will report to the commanding general for assignment to duty.

First Lieutenant Horace R. Collins, Jr., is relieved from assignment and duty with the South Central Remount Area Headquarters, San Angelo, Texas, effective on or about April 1, 1941, and is then assigned to duty at the Air Corps Basic Flying School, San Angelo, Texas, and will report for duty.

First Lieutenant Benjamin D. Blood is assigned to duty as attending veterinarian, Fort Screven, Ga., in addition to his other duties.

The following officers of the Veterinary Corps Reserve, now on extended active duty at the stations indicated, are directed to proceed to Chicago, Ill., and report to the commanding officer, Chicago Quartermaster Depot, for temporary duty for a period of 30 days for the purpose of pursuing a course of instruction, commencing on March 18, 1941, in the inspection of meat, meat-food, and dairy products, under the depot veterinarian. Upon completion of this duty each of these officers (first lieutenants unless otherwise indicated) will return to his proper station:

John P. Ayres, Fort Hancock, N. J. Ralph C. Close, Fort Totten, N. Y. Philip L. Gauntt, Jr., Fort Eustis, Va.

Floyd W. Koebel, Holabird Quartermaster Depot, Md.

Herbert I. Ott, Camp Blanding, Fla. Mark E. Gale, Camp Claiborne, La. Elmer L. Matthews, Camp Forrest, Tenn. Albert Conrad Nagle, Fort Benj. Harrison, ad.

Louis A. Dehner, Camp Joseph T. Robinson, Ark.

William S. Houk, Fort Riley, Kan.

Burt W. English, Fort Brown, Texas. Jack A. King, Fort Clark, Texas. James R. Ketchersid, Fort Bliss, Texas.

Leonard L. Ogburn, c/o Sta. Vet., 448 S. Hill St., Los Angeles, Calif.

Captain Richard E. Geisler, Fort Douglas, Utah. Major Ray S. Youmans, 101st Med. Reg.,

Camp Edwards, Mass.

Loseph L. Wesley Elgin Field Fla

Joseph L. Wesley, Elgin Field, Fla. Russell J. Henshaw, Chanute Field, Ill.

BAI Transfers

Vern C. Bartlett from Jefferson City, Mo., to St. Louis, Mo., on meat inspection.

Coleman P. Callaway from Fort Worth, Texas, to Vernon, Texas, in charge of meat inspection.

Lewis E. Epple from Austin, Minn., to New York City, in charge of meat inspection.

Frank A. Henney from Lincoln, Neb., to Jefferson City, Mo., on tuberculosis eradication.

James L. Hourrigan from St. Paul, Minn., to Albuquerque, N. Mex., on Bang's disease.

Karl Knoche from St. Paul, Minn., to Albuquerque, N. Mex., on tuberculosis eradication.
George H. Oakes from West Fargo, N. Dak..

to South St. Paul, Minn., on meat inspection.

Edwin S. Ring from Newark, N. J., to Jersey
City, N. J., on meat inspection.

Nathan M. Rosenbaum from South St. Paul, Minn., to Dubuque, Iowa, on meat inspection.

James A. Sasmor from Indianapolis, Ind., to Harrisburg, Pa., on Bang's disease.

Daniel B. Schlosser from Harrisburg, Pa., to Indianapolis, Ind., on Bang's disease.

Edgar L. Sink from Oklahoma City, Okla., to Albuquerque, N. Mex., on Bang's disease.

Claude A. Smith from Lansing, Mich., to Beltsville, Md. (Animal Disease Station).

Bijah A. Taylor from Chicago, Ill., to Knoxville, Tenn., on meat inspection.

Retirements.—Robert E. Cochrane, Milwaukee, Wis.; William A. Davidson, Spokane, Wash.; Charles H. Deisel, Chicago, Ill.

New Meat-Inspection Regulations

The labeling and marketing requirements for meat and meat products were modified by an amendment to the meat-inspection regulations which become effective October 1, 1941. An important feature of the amendment is that the ingredients of a meat or meat product shall be indicated on the label, showing the list of the components in the order of their prominence. Moreover, meat must not be covered with cellophane in such a way as to give a wrong impression of the leanness or quality of the product enclosed. A legend of new and uniform design will be used. As formerly, it will include the name of the product, net weight, and the name and address of the maker. The new regulations apply also to imported meat and meat-food products.

Federal Court Convicts Man Posing as BAI Employé

In September 1940, it was reported to the inspector in charge of the Bureau of Animal Industry field office at Jackson, Miss., that a Dr. Charles Hager Costner was at Mayersville, Miss., advising livestock owners that he is a veterinarian employed by the Bureau in that state and authorized to vaccinate livestock for anthrax. He was offering his services free, charging only for the vaccine.

As this party had no connection with the Bureau, an inquiry was started by the Federal Bureau of Investigation which resulted in the arrest of Costner for pretending to be an officer or employé acting under the authority of the United States. The case went on trial in Biloxi, Miss., February 25, 1941, and Costner was convicted and sentenced to serve a term of one year and one day in a federal institution.

STUDENT CHAPTER ACTIVITIES

Colorado State College

A meeting of the Colorado chapter was held on March 24, with H. E. Kingman of the Wyoming Hereford Ranch at Cheyenne, Wyo., as the guest speaker. Dr. Kingman discussed methods and uses of artificial insemination.

At a session on April 7, State Veterinarian Port of Wyoming spoke on problems confronting the veterinarian who inspects animals for interstate shipment. This topic was especially interesting to the seniors who are taking the accredited-herd examination.

W. A. HOWARTH, Secretary.

Iowa State College

At a regular meeting of the chapter on March 25, Guest Speaker D. M. Campbell of Chicago, Ill., editor of *Veterinary Medicine*, spoke on historical and present aspects of veterinary education.

Roy Price reported on transportation facilities for the spring dance. Mert Miner estimated the cost of equipment needed for the Veterinary Student office and reviewed last year's expenditures for similar items.

JOE A. GRAHAM, Secretary.

Kansas State College

On March 20, the Kansas chapter presented before a large audience a four-reel motion picture, entitled "Meat and Romance," portraying the handling of meat for food in the home.

The annual student-alumni-faculty dinner was held April 26 at the Methodist Church in Manhattan and the dance following this event was held at the Community House.

Canadian Students Called for Military Training

According to a recent communication from C. D. McGilvray, principal of the Ontario Veterinary College, Canadian colleges were called upon early in April to complete their sessions and release the students for military training not later than April 14. In compliance, Ontario Veterinary College held examinations and ended its school year on April 13, several weeks earlier than usual.

AMONG THE STATES

Arizona

Competent Veterinarian Wanted.—In the southwest corner of Arizona, up high near the continental divide, is a horse ranch of considerable importance, known as the Lanteen Arabian Foundation. It is located among the headwaters of several streams at an altitude of 5,000 ft. Except in the summer months when the rainy season occurs, the climate is one of almost continuous sunshine. The winters are warm.

Here, several breeding experiments are in progress. Besides the raising of Arabians, the breed is being crossed with off-color mares to produce golden-coated palominos. With a selected band of pinto brood mares, half Arabian pintos also are being produced.

These crossings are yielding action and carriage unequaled in Arabians and they infuse the intelligence and lovable disposition for which the Arabian is famous.

This ranch was founded by the Lanteen Medical Laboratories, Inc., makers of hormones, who have turned to horse-breeding experiments of interest to the riding-horse world. Mr. Riddlesbarger of this enterprise writes that the ranch would be an ideal place for a competent veterinarian to continue in private practice. There is a ranch house and a modest salary attached to the position. The post office address is Hereford, Ariz.

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Dourine.—Unless accompanied by a general health certificate and another certifying that the animal is free from dourine, horses can not be shipped into this state from California on account of the alleged presence of that disease in the San Diego area. An outbreak of dourine in Arizona last year led the California State Department of Agriculture to ban the importation of Arizona horses.

California

Brucellosis.—Dairymen of the Imperial Valley have started a voluntary vaccination pro-

gram against brucellosis which is to be conducted under the direction of County Veterinarian Roberts,

Colorado

Hog Cholera.—Outbreaks of hog cholera in the south and south central parts of the state are attributed by State Veterinarian Gow in press reports to disobedience of the regulations governing the management of sales rings.

District of Columbia

Medical Society Honors J. R. Mohler.—Among the overlooked news item of the past few months is the certificate and honorarium of \$500 presented to John R. Mohler in March by the Medical Society of the District of Columbia for the "Lectureship Honor of the Year," which is a prize awarded by the Kober Foundation of Georgetown University. In response Dr. Mohler spoke on the progress made in the eradication of brucellosis which before 1934, when the campaign was started, took an annual toll of \$50,000,000 from the cattle industry.

Florida

Twenty-two veterinarians attended the seventh semiannual meeting of the South Alabama-West Florida Veterinary Medical Association, held at Marianna, April 25. A question box and papers on x-ray therapy and parasitism were outstanding features of the session.

Illinois

Central Illinois Association.—The Central Illinois Veterinary Medical Association met in Springfield, April 18, with 45 members present.

C. E. Fidler, newly appointed chief veterinarian of Illinois, was the principal speaker. Several springtime diseases were discussed, including equine encephalomyelitis, swine erysipelas and so-called baby-pig disease. It was the consensus that swine erysipelas is becoming prevalent in the state and that a more effective prophylactic than is now available could be used to advantage. It also was pointed out that a considerable number of cases of baby-pig disease are in reality swine erysipelas.

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Midwest Association.—With C. L. McGinnis of Peoria, Ill., presiding, the Midwest Small Animal Association met in annual session at the Hotel Burlington in Burlington, April 3.

Featured on the program were the following contributors and subjects:

Frank E. Walsh of the Department of Obstetrics, Iowa State College, Ames, Iowa, on "The Pathology and Physiology of the Reproductive System of the Bitch."

Hubert C. Smith of Fort Dodge Laboratories, Fort Dodge, and J. H. Krichel of Keokuk, on "Leptospirosis" (illustrated).

E. C. Khuen of Evanston, Ill., on "Parasitic Skin Problems."

A. H. Quin of Fort Dodge Laboratories, Des Moines, on "Tularemia of Beagle Hounds."

A. C. Merrick of Brookfield, Ill., on "Canine Encephalitis."

Officers elected for the ensuing year are C. M. Collins of Ottumwa, president; P. J. Meginnis of Champaign, Ill., vice-president; Wayne H. Riser of Des Moines, secretary-treasurer (reëlected); and C. E. Hunt of Mount Pleasant and C. L. McGinnis of Peoria, Ill., trustees.

A question box on small animal problems was conducted by H. G. Dow of Fort Madison.

East Central Society.—Fifty-four veterinarians from 17 counties attended a meeting of the East Central Veterinary Medical Society held on April 10 at Carl G. Spencer's new small animal hospital in Cedar Rapids. Prior to the meeting the group gathered at the Hotel Montrose for dinner.

Contributors to the program were Jas. C. Carey of West Liberty, Maurice C. Larson of Keystone, John B. Bryant of Mount Vernon, Joe W. Giffee of Cedar Rapids, P. V. Neuzil of Blairstown, Fred J. Crow of Iowa City, and Wm. J. Pirie of Springfield.

Central Iowa Association.—The Central Iowa Veterinary Medical Association convened for a regular monthly session on March 13 at Cedar Rapids. Professor Evans of the psychology department at Iowa State College, Ames, was the guest of the evening and spoke on human mental abnormalities.

The technical program comprised talks by W. C. VerPloeg of Pella on "Swine-Disease Problems," L. C. Blackburn of Earlham on "Fees and Ethics in Practice," and H. U. Garrett of St. Charles on "Products of Special Value in Practice." State Veterinarian Seidell outlined and discussed pending bills in the legislature having to do with community-sales regulations and Bang's disease appropriations.

Rabies in Horses.—Five isolated cases of rabies in horses occurred in Powesheik and Jasper counties between January 15 and March 15. Canine rabies does not exist in this area, but two positive civet cat heads were noted. One farmer found a skunk biting the legs of feeder cattle.

According to Fred Maxfield of Gilman, a client was severely bitten on the arm while trying to halter a rabid horse, and near Jefferson, a farmer was bitten by a rabid cat.

A. H. Quin, Resident Sec'y.

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Foot-and-Mouth Disease.—Under date of March 14, the Sioux City Live Stock Sanitary Committee sent the following communication to Walter F. George, chairman of the Senate Foreign Affairs Committee:

Members of the Sioux City Live Stock Sanitary Committee are seriously concerned about any changes in the sanitary regulations for importing cattle and fresh meat products from countries harboring foot-and-mouth disease or other dangerous animal diseases. At a recent meeting of the committee the following resolutions were passed:

"Whereas, cattle production in the United States is now in the healthiest condition that it has been Bovine tuberculosis has been for several years. eradicated, practically with the whole nation officially modified accredited. Foot-and-mouth disease has not been present since the outbreak of The southern fever tick has been almost 1932. exterminated from the herds where great damage Cattle scabies is well under was done. after many years of persistent work. Effective methods are being followed to control Bang's disease. These great campaigns to eliminate present and future cattle losses have cost great sums of money and required untiring efforts of farmers and sanitary officials, and

"Whereas, cattle production is now near the peak of numbers, market prices are good, and it is possible to increase production if export trade can be developed.

be developed, and

"Whereas, foot-and-mouth disease is known to be one of the most highly contagious, infectious virus diseases affecting livestock and constitutes a menace to public health, in that the human family is also susceptible to this devastating scourge.

It incurs huge economic losses to the live stock industry because it materially restricts the movement of livestock and livestock feeds in areas adjacent to infected centers. In infected territories movement of livestock, feeds of all kinds, and many agricultural products is completely immobilized as a result of quarantine measures necessary to control and eradicate foot-and-mouth disease.

Ten outbreaks of this disease have occurred in the United States—1870, 1880, 1884, 1902, 1908, 1914, 1924 (2), 1929 and 1932—and the United States has spent \$200,000,000 since 1900 to stamp out foot-and-mouth disease brought into this country and

try and
"Whereas, our cattle would be highly susceptible
to exposure to this disease if it were introduced,
because our cattle have not built up any resistance
by coming in contact with it. As a result, undoubtedly, losses would be extremely heavy and
disastrous to the whole livestock industry and

disastrous to the whole livestock industry, and "Whereas, the United States is committed to a definite program of controlling animal diseases, therefore,

"Be it resolved: That we urge the Foreign Affairs Committee of the United States Senate not to endanger our livestock industry through weakening our present sanitary regulations and tariffs so that livestock and fresh meat products can be imported from countries and areas harboring foot-and-mouth disease and other dangerous animal contagions."

Kansas

Northwest Kansas Group.—On March 16, the northwest Kansas group met at Osborne. The session, arranged by local veterinarians with the aid of J. W. Lumb, Kansas State College extension veterinarian, was sponsored by C. A. Rliss.

L. M. Roderick discussed equine encephalomyelitis and Bang's disease, and a general discussion of community sales followed.

Twenty veterinarians and eleven ladies were in attendance.

E. J. FRICK, Resident Sec'y.

Louisiana

Tenth Veterinary Conference.—The annual veterinary conference for 1941, given by the state university, was held at Baton Rouge, February 26-27. Dean J. G. Lee, Jr., of the



Officers of the Louisiana state association for 1941. Left to right: F. F. McNeeley, M. H. Gandy and C. M. Heflin.

College of Agriculture delivered an address of welcome, widely quoted by newspapers throughout the country, emphasizing the national importance of a more balanced agricultural program and the need of coöperative work to that end. He pointed out the part the veterinary service must play in developing the kind of livestock such a reform requires. Carle Libby, U. S. Bureau of Animal Industry veterinarian, responded.

Chas. W. Bower, practitioner of Topeka, Kan., spoke on "Digestive Disturbances of Dogs," and "Therapeutic Agents for Small Animals." These two popular topics and the discussions brought out a wealth of details of practical value.

J. H. Musser, M.D., of the state board of health explained the reorganization of the public health service of Louisiana under which there is being formed centrally controlled health units in each parish. Forty-eight parishes are already so organized, the speaker stated.

B. T. Simms, director of the Regional Animal Disease Research Laboratory at Auburn, Ala., reviewed the work that is being carried out at that federal institution. Dr. Simms also spoke on the agricultural and the general social conditions of the South and the utilitarian rôle of the veterinary profession in these connections.

James Farquharson, professor of surgery, Colorado State College, who was scheduled to participate in the program, was unable to appear on account of a temporary illness. His paper on acetonemia, which proved to be a masterpiece on the subject, was read by Dr. Simms. The large animal clinic he was going to direct was abandoned. The small animal clinic, featuring a variety of surgical and diagnostic demonstrations, was conducted by Chas. W. Bower and W. C. Schofield.

Harry D. Wilson, commissioner of agriculture, was the main speaker at the banquet. This event was further enlivened by songs, instrumental music and readings by students of the School of Music and a declamation by Miss Elizabeth Ann Quilty, the daughter of Dr. Quilty of Lake Charles.

The state association elected the following officers: F. F. McNeeley, president; M. H. Gandy, vice-president; and C. M. Heflin, secretary-treasurer—all of Baton Rouge.

Michigan

Bang's Disease Conferences.—Throughout the southern peninsula of Michigan, a series of meetings are being held to discuss matters pertaining to Bang's disease, with special reference to the use of vaccine. The U. S. Bureau of Animal Industry and the Michigan Bureau of Animal Industry are coöperating in these conferences. Adrian, Lapeer, Saginaw, Kalamazoo, Grand Rapids and Lansing have been designated as the meeting places.

These discussions among practicing veterinarians, state officials and federal veterinary inspectors are bringing about a clearer understanding of the use of vaccination as a means of controlling Bang's disease.

E. C. W. SCHUBEL, Resident Sec'y.

Missouri

Annual Short Course.—The annual Missouri Short Course for Graduate Veterinarians was held in the veterinary building of the College of Agriculture, University of Missouri, Columbia, February 11-13.

The sessions consisted of papers and dis-

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cussions on subjects of timely interest along with well-planned clinical demonstrations.

G. D. Clark, D.V.M., of Hannibal, was victorious in a court action for \$30,000 damages brought against him by a non-graduate practitioner of that city.

The suit grew out of the arrest of the nongraduate, V. Weidner, for practicing without a license. Weidner was found not guilty by a jury, whereupon he brought suit against Dr. Clark for false arrest and malicious prosecution. After hearing the evidence, the judge directed the jury to return a verdict in favor of the Doctor.

Montana

Veterinarians give keen political competition, J. S. McFarland has just demonstrated. Governor Ford, newly elected, has announced the appointment of Dr. McFarland to the office of state game warden. The doctor and his wife, who is also a graduate veterinarian, are the owners of a successfully operated fur farm in northern Montana.

E. A. TUNNICLIFF, Resident Sec'y.

New York

John R. Mohler, chief of the U. S. Bureau of Animal Industry, has been chosen a member of the Scientific Advisory Board of the American Museum of Health, offspring of the medical exhibit of the New York World's Fair, installed at Flushing Meadows Park. The Museum is a monument to American medicine—to the part medical science has played in the development of the United States.

New York City Association.—The annual dinner of the Veterinary Medical Association of New York City was held at the Town Hall

Club in New York City, March 5.

Following the dinner, Roy Waldo Miner, curator of marine life, American Museum of Natural History, spoke of his studies of coral reefs and pearl beds at the bottom of the sea when he was securing material for exhibits in the Museum.

North Carolina

Rabies Vaccination.—Under what is known as the "new county inoculation law," anyone owning or harboring a dog 3 months of age or older must have the animal vaccinated against rabies once a year or be subject to a fine. The law will become effective June 1, 1941. On request, an owner must furnish evidence that his dog has been vaccinated by a veterinarian. Enforcement lies in the hands of peace officers and game wardens.

Ohio

Annual Conference Set for June 18-20.—The 14th annual conference of the College of Veterinary Medicine, The Ohio State University, will be held June 18-20 and, according to present plans, will offer one of the most comprehensive programs in the history of this series. Particular emphasis will be given to subjects of interest to the practitioner.

Fulstow and Blattenberg.—Looking much younger than his years and far from being incapacitated, J. H. Fulstow, 80 years old, pioneer practitioner of Norwalk, was the honor guest at a banquet given by the Firelands Horse Association in that city. The next day, says a press report, the Doctor, who still rides a horse like a cavalryman, went out to the country to dehorn a herd of cows. Doctor Fulstow's fame as a skillful surgeon dates 'way back into the 19th century. He and the late John Blattenberg of Lima were once the main



Annual Dinner of the Veterinary Medical Association of New York City.

attractions of many a surgical clinic throughout the country. Fulstow's technic in vaginal ovariectomy of mares and Blattenberg's modification of William's operation for roaring are mileposts of large animal surgery.

Pennsylvania

Keystone Association.—The Keystone Veterinary Medical Association inaugurated an experiment in public relations with a meeting open to the public, held March 14 in the veterinary building on the University of Pennsylvania campus, Philadelphia.

The principal speaker was Cassius Way of New York City, who discussed "What the Veterinary Profession Means to Mankind." He illustrated his talk with a series of pictures supplied by the Pitman-Moore Company. Dr. Way's presentation was followed by colored motion pictures depicting interesting cases photographed at the University of Pennsylvania. E. L. Stubbs discussed the pictures.

Approximately 175 persons attended this meeting.

A. HENRY CRAIGE, JR., Resident Sec'y.

South Carolina

Annual Business Session.—At the annual business meeting of the South Carolina Association of Veterinarians, held at the Wade Hampton Hotel in Columbia, January 21, the following men were elected to office for the ensuing year: J. T. Dickson of Rock Hill, president; H. L. Sutherland of Union, vice-president; and R. A. Mays of Columbia, secretary-treasurer.

Virginia

Veterinary Conference.—The seventh annual conference for graduate veterinarians was held at the Virginia Polytechnic Institute, Blacksburg, February 11-13. The attendance was 40. I. D. Wilson, E. P. Johnson and J. W. Scales presided in that order on the three days.

J. W. Scales spoke on "Artificial Insemination in Dalry Practice" and "Entozon Granules in the Treatment of Sterility."

Films on reproductive disorders in horses and cattle and on embryotomy were exhibited by the Winthrop Chemical Company, Inc.

The other reporters were: Norman J. Pyle of Lederle Laboratories; A. E. Wight, president of the AVMA; W. S. Gochenour, director of the biological laboratories of Pitman-Moore Company; Ralph B. Little, The Rockefeller Institute for Medical Research; H. C. Given, State veterinarian; J. C. Lange, practitioner, Greensboro, N. Car.; and E. P. Johnson of the state experiment station. The technical subjects were: canine infections (Pyle), bovine brucellosis (Gochenour), bovine mastitis (Little), canine rabies (Pyle), pneumonia in dogs (Lange), poultry diseases (Johnson).

A banquet was held at the Faculty Center.

J. J. Harrar of the Virginia Polytechnic Institute acted as toastmaster. President Wight of the AVMA and State Veterinarian Givens were the principal speakers. A noteworthy event of the banquet was the reading of a telegram from Geo. C. Faville (Iowa '79) announcing his inability to attend. [Doctor Faville is probably the oldest veterinarian in the United States. His name and work have been in the foreground continuously since the "early days."]

The Virginia State Veterinary Medical Association held a business session during the conference. Three new members were elected and three candidates took the state board examinations. The officers of the Association, all of whom were reëlected, are: R. Todd Gregory, president, Fredericksburg; H. L. Lyon, first vice-president, Hillsville; J. P. Landis, second vice-president, Norfolk; T. P. Rowe, treasurer, Richmond; and A. J. Sipos, secretary, Richmond.

A. J. Sipos, Secretary.

COMING MEETINGS

- Connecticut Veterinary Medical Association. Hartford, Conn. May 1, 1941. Geo. E. Corwin, secretary, 269 State Office Bldg., Hartford, Conn.
- Dallas-Fort Worth Veterinary Medical Society. Fort Worth, Texas. May 1, 1941. Frank Brundrett, secretary, 1809 Atwood, Route 2, Dallas, Texas.
- Houston Veterinary Association. Houston, Texas. May 1, 1941. John Tom Kirby, secretary, 2421 S. Shepherd Drive, Houston, Texas
- St. Louis District Veterinary Medical Association. Roosevelt Hotel, St. Louis, Mo. May 2, 1941. J. P. Torrey, secretary, 555 N. 14th St., East St. Louis, Ill.
- Small Animal Hospital Association. Los Angeles, Calif. May 6, 1941. W. K. Riddell, secretary, 3233 W. Florence Ave., Los Angeles, Calif.
- New York City, Veterinary Medical Association of. Hotel New Yorker, New York, N. Y. May 7, 1941. J. J. Merenda, secretary, 136 W. 53rd St., New York, N. Y.
- Ak-Sar-Ben Veterinary Medical Association. Fontenelle Hotel, Omaha, Neb. May 12, 1941. J. D. Ray, secretary, 1124 Harney St., Omaha, Neb.
- Chicago Veterinary Medical Association. Hotel Sherman, Chicago, Ill. May 13, 1941. G. S. Elwood, secretary, 5449 Broadway, Chicago, Ill
- Southeastern Michigan Veterinary Medical Association. Medical Arts Bldg., 3919 John R. St., Detroit, Mich. May 14, 1941. F. D.

Egan, secretary, 17422 Woodward Ave., Detroit, Mich.

Kansas City Veterinary Medical Association. Kansas City, Mo. May 19, 1941. Glen L. Dunlap, secretary, 800 Woodswether Road, Kansas City, Mo.

San Diego County Veterinary Medical Association. Zoölogical Research Bldg., Balboa Park, San Diego, Calif. May 19, 1941. Paul D. DeLay, secretary, State Poultry Pathological Laboratory, Balboa Park, San Diego, Calif.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. May 21, 1941. Charles Eastman, secretary, 725 S. Vancouver Ave., Los Angeles, Calif.

Mississippi Valley Veterinary Medical Association. Armory, North Broad St., Galesburg, Ill. May 22, 1941. L. A. Gray, secretary, Bushnell, Ill.

Keystone Veterinary Medical Association. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa. May 28, 1941. A. Henry Craige, Jr., secretary, University of Pennsylvania, Philadelphia, Pa.

Ohio State University Veterinary Conference. The Ohio State University, Columbus, Ohio. June 18-20, 1941. O. V. Brumley, dean, College of Veterinary Medicine, The Ohio State University, Columbus, Ohio.

North Carolina State Veterinary Medical Association. Wrightsville Beach, N. Car. June 26-27, 1941. J. H. Brown, secretary, Tarboro, N. Car.

Wisconsin Veterinary Medical Association. Chippewa Falls, Wis. June 26-27, 1941. B. A. Beach, secretary, University of Wisconsin, Madison, Wis.

American Veterinary Medical Association. Murat Theater and Shrine Temple, Indianapolis, Ind. August 11-15, 1941. John G. Hardenbergh, executive secretary, 600 S. Michigan Ave., Chicago, Ill.

*Purdue University Short Course for Veterinarians. Purdue University, Lafayette, Ind. October 15-17, 1941. C. R. Donham, head, Department of Veterinary Science, Purdue University.

State Board Examinations

Nebraska Board of Veterinary Examiners. State Capitol Bldg., Lincoln, Neb. June 18, 1941. All applications must be filed with the Bureau of Examining Boards at least 15 days prior to date of examination. North Carolina State Board of Veterinary Medical Examiners. Wrightsville Beach, N. Car. June 25, 1941.

Connecticut Board of Veterinary Registration and Examination. Office of the Secretary, State Office Bldg., Hartford, Conn. July 1, 1941.

DEATHS

Charles W. Stiles, 74, of Washington, D. C., discoverer of the hookworm parasite and former surgeon general of the U. S. Public Health Service, died on January 24, 1941, at the Marine Hospital in Baltimore, Md.

Dr. Stiles was a graduate of Wesleyan University and had studied in several European universities. After a year of post-graduate work at the Trieste zoölogical station, Pasteur Institute, Paris, and at the College of France, he became zoölogist for the U. S. Bureau of Animal Industry. He was professor of medical zoölogy at Georgetown University from 1892 to 1906, and also served with Johns Hopkins University and the Army and Navy medical schools as special lecturer.

Dr. Stiles was elected to honorary membership in the AVMA in 1927.

G. A. H. Edmiston of Easton, Md., died on March 23, 1941, in Miami, Fla.

Dr. Edmiston was born in New York, N. Y., December 18, 1878, and was graduated from McKillip Veterinary College in 1914. He was assistant state veterinarian of South Dakota in 1916 and 1917, resigning at the start of World War I to join the U. S. Bureau of Animal Industry. He was in the service of the Bureau until 1919, when he resigned to enter private practice at Easton.

Dr. Edmiston was a member of the Maryland Veterinary Medical Association.

Frank C. Herbert, 78, of Plainfield, N. J., died on March 28, 1941.

Born at Marlboro, N. J., March 9, 1863, Dr. Herbert was graduated from the New York College of Veterinary Surgeons in 1889.

R. C. Calkins, 56, of Rock Island, Ill., died on April 8, 1941, following an extended illness.

Born in Hanna City, Ill., April 19, 1884, he was graduated from the Chicago Veterinary College in 1908.

C. M. Riley, assistant veterinarian in the U. S. Bureau of Animal Industry, died at Portland, Ore., February 16, 1941.

Dr. Riley was a graduate of McKillip Veterinary College, class of 1909.

Robert White, 88, of St. Paul, Minn., died on March 2, 1941.

Dr. White was a graduate of the Ontario Veterinary College, class of 1879.

^{*}Although the Journal's policy is to list coming state meetings and short courses only two months in advance, the Purdue short course is given this early listing due to a conflict that occurred last year whereby another important conference was held at the same time as the Purdue event. This announcement is intended to help prevent the repetition of such a conflict.

ALUM PRECIPITATION?

01

ALUMINUM HYDROXIDE ADSORPTION

- for greater bacterin potency?

CUTTER research workers found the answer to that problem ten years ago when they were pioneering, with blackleg, the chemical precipitation of bacterial vaccines.

Aluminum bydroxide adsorption is markedly more effective!

We appreciate the compliment of other laboratories belatedly following our lead in the use of aluminum compounds, but wish to point out to our friends in the veterinary profession that the word "alum" is no "open sesame" to bigger and better bacterins.

Purified aluminum hydroxide is selective in its action as it almost completely adsorbs the antigens to the comparative exclusion of other substances present. The antigens remain in the adsorbed state until injected. The various aluminum salts (known as "alum") on the other hand have an inadequate adsorptive effect except in the presence of aluminum hydroxide and even then such adsorption is both nonselective and reversible. As a result, not all of the antigens are adsorbed and those that are may go back into solution.

For bacterins in which the antigens are truly adsorbed, so that the desirable extending effect is assured, insist on "aluminum hydroxide adsorbed."

CUTTER Laboratories

Among Cutter's aluminum hydroxide adsorbed vaccines

> Blacklegol Charbonol

Clostridium Hemolyticum Bacterin (Red Water)

Hemseptol

Mixed Bacterin (Bovine) Formula 2 and 3

Streptococcus Bacterin (Equine)

Mixed Bacterin (Equine) Formula I and 2

Pelmenal

Mixed Bacterin (Ovine)

Tetanus Toxold

Mixed Bacterin (Porcine) Formula I



NO-SCOUR POWDER (Armour) was developed by the Armour Veterinary Division after intensive study of the calf scour problem.

This study indicated the need for a preparation to assist in the correction of abnormalities of the milk and check the growth of (and toxin formation from) bacteria in the gastro-intestinal tract of the calf. Such a preparation should help to prevent or correct scour, and thereby minimize its heavy mortality.

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No-Scour Powder (Armour) provides: Sterilized Medicinal Bone Powder, Calcium Lactate, Calcium Gluconate, Calcium Carbonate Precipitated. The dose is a round teaspoonful per calf per feeding.

The preparation is available in 8 ounce and 5 pound cans from Dr. Robert D. Wall, 910 28th Street, Des Moines; Dr. Robert J. Hoskins, 3203 E. Washington Street, Indianapolis; Dr. H. W. Brown, 623 W. Main Street, Fort Wayne; Mr. A. G. Carter, Findlay, Ohio; and most Armour Branch Houses and Creameries,

Veterinary Division
ARMOUR and COMPANY
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An' Related Topics

Cabbage and strawberries are prolific sources of vitamin C, comparing favorably in that respect to citrus fruit and tomatoes.

There is a great deal about vitamin E, a comparative newcomer to the vitamin family, that is as yet unknown.—Morgan in Your Life.

Workers at the University of Pennsylvania and the Squibb Institute of Medical Research announce a vaccine for measles which is said to be the first victory over a virus disease of childhood.

Egg consumption can hardly be maintained at the present levels or hope to be increased unless there is a rapid improvement in the supply of good eggs.—From Poultry Tribune.

Nearly 900,000,000 chicks are produced annually in the mammoth incubators of commercial hatcherymen. While many of these are marketed as broilers, most of them replace the laying hens.

On Jan. 1, 1925, there were just over 390,000,000 hens and pullets on farms and they produced 35,000,000,000 eggs. On Jan. 1, 1939, the number of hens and pullets was 371,000,000 and these layed 38,000,000 eggs. A logical objective for 1941 is 375,000,000 head.—W. D. Termohlen in Poultry Tribune.

TVA, better known as the Muscles Shoals project, is going to pay big dividends, not only to the South but the whole country, according to the Louisville Courier Journal (Jan. 17, 1941). Improved concentrated phosphate fertilizers worked out by the national laboratory connected with the project are destined to safeguard the soil resources of this country.

(Continued on page xviii)



Now supplied in half-pound can

INSISTENT requests from veterinarians for 'B-F-I' powder in a handy large container brings to them this new economical dual-purpose half-pound can.

Dual Purpose Top

For Shaking



'B-F-I' is extensively employed in the treatment of metritis and allied conditions in cattle. For this purpose it may be used by suspending the powder in mineral oil or by placing the powder in a gelatin capsule.

'B-F-I' has a wide field of general clinical use—as a dry dressing following spaying operations, for cuts, skin abrasions and other wounds.

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GEORGE ALEXANDER DICK, Dean, Veterinary Faculty

An' Related Topics

(Continued from page xvi)

Interesting History

THE AMENDMENT to the constitution that increased the veterinary college course from two to three years was adopted at the 29th annual meeting held at Boston. September 1892. The amendment reads: "He (the applicant for membership) shall be a graduate of a regularly organized and recognized veterinary school which shall have a curriculum of at least three years of six months each, specially devoted to the study of veterinary science, and whose corps of instructors shall contain at least four veterinarians." The amendment was passed unanimously with an added stipulation that the step "shall not apply to students who matriculate prior to January 1, 1893."

At the 1892 annual meeting, President Huidekoper reported in his annual address that there were over 21 million horses and mules, valued at over a billion dollars, in the United States. He gave the number of dairy cows as 16,416,351; of beef cattle, 37,651,239; of sheep, 44,938,365; and of swine, 52,389,019. On the total, he placed the value at \$2,250,000,000. Compared with the census of the previous decade (1880-1890), the increase was 50 per cent for horses and mules; 2 per cent for beef cattle; 3 per cent for sheep, and from 3 to 4 per cent for hogs. [The population of Continental United States (1890 census) was 62,987,714.]

The First Silos

The first above-the-ground silo was built in 1880 on what is now the Fred Pabst farm near Oconomowoc, Wis. It was built of limestone and was lined with cement. This silo still stands—61 years old. In 1887, there were 60 silos in Wisconsin. Within the next year the number built was between 1,200 and 1,500. — From The Prairie Farmer.

The first motor car propelled by an internal combustion engine was built in France in 1868.

(Continued on page xx)

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FRISKIES (Dry) Albers Milling Co., Seattle, Wash.; Los Angeles, Calif.; Peoria, Ill.

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600 S. Michigan Ave., Chicago

An' Related Topics

(Continued from page xviii)

Soil erosion has damaged half of the country's land and is costing the United States a loss of \$3,800,000,000 a year the Soil Conservation Service claims.

Forsooth

The Americas are the only land areas producing enough livestock to provide their people with adequate supplies of meat and dairy products. Preserving the livestock is one of the most important problems in national economy.—The Prairie Farmer.

"One of the most important" is a concession not made in the veterinary circle. " I_{δ} the most important" rings more true, since without livestock there would be neither problems nor men to solve them.

(Continued on page xxii)

AUTOMOBILE ACCIDENTS TABLE I—Types of Accidents Resulting in Deaths and Injuries—1940

	Persons Killed	PER CENT	Persons Injured	PER CENT		
Collision with						
Pedestrian	12,500	35.7	290,400	22.0		
Automobile	10,400	29.7	739,590	56.0		
Horse-drawn vehicle	70	.2	. 3,940	.3		
Railroad train	2,070	[5.9]	7,880	. 6		
Street car	140	2.4	12,270	.9		
Other vehicle	100	F/T . 3	5,220	.4		
Fixed object	3,690	10.5	98,300	7.5		
Bicycle	800	2.3	43,190	3.3		
Non-collision	5,030	14.4	113,990	8.6		
Miscellaneous	200	.6	5,220	.4		
Total	35,000	100.0	1,320,000	100.0		

TABLE II-Actions of Drivers Resulting in Deaths and Injuries-1940

	PERSONS KILLED	PER CENT	Persons Injured	PER CENT		
Exceeding speed limit	9,600	40.0	221,190	25.9		
On wrong side of road	4,150	17.3	123,830	14.5		
Did not have right-of-way	3,000	12.5	235,700	27.6		
Cutting in	360	1.5	21,350	2.5		
Passing standing street car	20	.1	1,700	.2		
Passing on curve or hill	290	1.2	10,250	1.2		
Passing on wrong side	290	1.2	10,250	1.2		
Failed to signal and improper signaling	820	3.4	80,280	9.4		
Car ran away—no driver	40	.2	850	.1		
Drove off roadway	1,230	5.1	23,060	2.7		
Reckless driving	3,580	14.9	100,770	11.8		
Miscellaneous	620	2.6	24,770	2.9		
Total	24,000	100.0	854,000	100.0		

-From News Bureau, Travelers Insurance Co.

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1941 AVMA MEMBERSHIP DIRECTORY

Here is a complete, up to-date listing of the Association's membershipnearly 6,400 names catalogued alphabetically—combined with the following data:

- 1) Dates and places of AVMA meetings chronologically tabulated, beginning with 1863.
- 2) Directory of all presidents, secretaries and treasurers since Association's founding in 1863.
- 3) Official Roster for 1940-1941, including officers and committees; special representatives; resident state, territorial, provincial and foreign corresponding secretaries; Women's Auxiliary; House of Representatives, as of March 1, 1941; and other features.

In addition, this valuable document contains the new Constitution, Administrative By-Laws and Code of Ethics as revised and adopted at the 77th annual meeting in Washington, D. C.

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An' Related Topics

(Continued from page xx)

No. 13

A New Zealand pilot of the RAF shot down behind the lines decorated his plane with the number 13 and pictures of a broken mirror, a man walking under a ladder and three cigarettes being lighted with one match. Underneath was printed "So What the Hell." In spite of all this he escaped to England disguised as a Belgian peasant.

Injuries in Airplane Crashes

The victim of an airplane crash suffers from injuries peculiar to that accident. There are multiple fractures and lacerations of soft tissues; the viscera eventrate into the thorax through a ruptured diaphragm; the heart may be torn from its blood vessels or ruptured. Rupture of the scrotum has been observed.—Swiss correspondent for the American Medical Association.

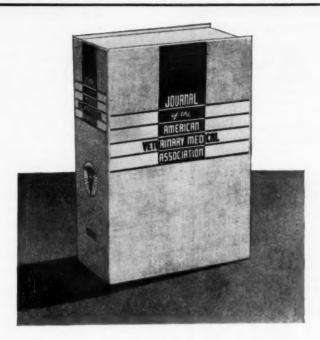
Re: Your Importance

In a troubled world, marching to "who knows where," the conservation of domestic animals is looming as a major project of a civilization—as a project that has been too long kept in the background unnoticed by the more glamorous human enterprises.

N. J. Aiken, head of the placement bureau of Washington state college (Daily Digest, USDA, June 17, 1940), gives training in agriculture as the best background for the jobseekers. Quoting: "The problems of agriculture as they relate to government and financial institutions have opened immense opportunities for the expertly-trained college graduate." Since the veterinarian is an "expertly-trained college graduate" delegated to give protection to agriculture's main investment and man's main source of nourishment—domestic animals—these words are a timely appraisal of veterinary science.

Moreover, it might be pointed out that the crowding of the veterinary college is a movement, intuitively conceived, by young Americans to step in and help a troubled world get back to first principles

(Continued on page xxiv)



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An' Related Topics

(Continued from page xxii)

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Preventive Medicine in Private Practice

Albeit preventive veterinary medicine is paramount in the breeding and using of animals and has lifted animal medicine to a much higher level than the pioneer practitioners dreamed of, it is not a branch of practice that gives the privately engaged veterinarian his living. Earnings come mainly from the sick. As a colleague recently remarked: "Preventive medicine is but an inroad to my practice."

Speaking before the Scottish Division of the National Veterinary Medical Association of Great Britain and Ireland, a member of the Society of Veterinary Practitioners said:

It is very well to talk about preventive medicine but when one is on a farm doing a job of work and in the course of the conversation suggests something along the line of preventive medicine, is one going to receive a fee for that? The answer is and will likely continue to be in the negative. If we are going to accept the tenets of preventive medicine, the State must contribute to the support of the veterinary surgeon . . . I care not by what means, but the veterinary surgeon must be protected.

The English-language countries have not subsidized private practitioners as much as the foreign-language countries have done. The rugged individualism or root-hog-ordie trend of thought is so deeply sunk into the souls of these countries that they do not come to the rescue of the struggling veterinary practitioner. His work is not yet computed. The citizenry is not aware of what he is doing for the security of his country, and neither he nor his colleagues of the higher bracket have yet impressed the masses with the importance of their professional labors. Telling the practitioners what they should do to earn a living is wasteful effort until "what they are doing" is more generally understood. The associations must attend to that.

The declining exports of farm products is the main subject under discussion in the agricultural circle but no one has a remedy.

Rationing Vast Populations

We have a letter from a veterinary practitioner in German-occupied France stating that he is "very busy because much greater importance is being placed upon the work of the local veterinarians." The letter goes on to say, in effect, that only a great war, on account of the misery it brings, can make people understand what veterinarians do for them in times of peace.

In 1917 and 1918 there were meatless days and sugar rationing in the United States not to mention the restriction on the use of gasoline. According to Mrs. Franklin D. Roosevelt, who generally tells what she thinks, such days may be just around the corner.

Those who circulated among the civilian populations of Europe during World War I are aware of what it means to be rationed for bread, for meat, for sugar, for coal, for fuel gas, for electric illumination and to be denied the use of gasoline, not for a short period but for four long years. Only lasting hunger can give one a deeper feeling of inferiority than rationing.

One way to aid in preventing such a plight is to keep the veterinary service intact and running "on high" in every corner of the country, for in addition to the inevitable reduction of food supply arising from dislocating large groups of the population, the ravage of animal diseases is an outstanding peril that is too little considered in programs of military preparedness.

The letter (*loc. cit.*) from a colleague in France carries an important message to the Selective Service Committee and the Congress in deciding what to do with the doctors trained respectively to preserve the health and the food supply of the nation.

Foxtail Johnson, funny man of *Prairie Farmer*, says "What us farmers want is a farm relief plan that will relieve us of the bother of foolin' with a farm." Sounding off on preparedness for war, F. J. wisecracks: "Talk about this country bein' prepared for war. It ain't even prepared for a preparedness program."

(Continued on page xxvi)

SELECTED ANIMALS...

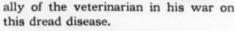
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An' Related Topics

(Continued from page xxv)

P.P.D. (purified protein derivative) as distinguished from old tuberculin is the popular tuberculin used for detecting the presence of tuberculosis in human medicine. The method of choice is the Mantoux intradermal technic.

The expectancy of human life in the United States mounted from 49.2 to 61.4 years since the turn of the century—since animal experimentation began in earnest to clarify the etiology of infectious diseases. But, what's a mere twelve years of life to the antivaccinationist?

The analysis of bananas for their vitamin values shows, per gram, 250 to 335 international units of vitamin A, 42 to 54 units of vitamin B₁ (thiamin), 10 to 11 milligrams of vitamin C (ascorbic acid) and 88 micrograms of vitamin B₂ (riboflavin).—
United Fruit Company.

The American Horse Show Association passed a resolution at its annual meeting January 10 continuing the memberships of the military horse shows and waiving all dues of military members during the period of the present national emergency.

The spitting cobra can squirt its venom a distance of more than 5 ft. and with such force that when the jet hits the glass of its cage, it strikes with an audible smack. The openings are located in front of the fang instead of at the tip as in ordinary snakes.

The 100 per cent horselessness of the armies of the British Isles and Canada is the outcome of their experiences in World War II up to the present time. The horses and mules are not objecting to their non-living successors but if called to arms for a major effort they will not sound the whinny of distress.

(Continued on page xxviii)

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An' Related Topics

(Continued from page xxvi)

The Procurement of Zoo Animals

Danual W. Gates, veterinarian of the West Brighton (N. Y.) Park Zoo, in one of a series of lectures on wild animals kept in captivity for public entertainment, explained how such animals are procured. The Doctor told his hearers that zoo animals are obtained from various sources, among which are (1) wild animal dealers, (2) other zoos, (3) donations by world travelers, (4) humane societies, and (5) animals left "on deposit."

Horses and Mules of the Army

The average price* paid for horses and mules by the U. S. Army during the fiscal year ended June 30, 1940, was:

Riding horses							*				.\$167.57
Light riding h	or	86	8							0	. 99.90
Light draft ho	rs	es									. 165.47
Draft mules .											. 207.69
Pack mules											

The horse strength of the United States cavalry was given as 9,000 which is less than half the number in the German army. The total number of horses in the German army as of August, 1940, was 791,000.—From the Veterinary Corps Bulletin.

The need of more and better veterinary service is shown by investigations of Iowa State College dairy specialists who declare that sterility, Bang's disease, tuberculosis, udder troubles and accidents cause one fourth of the cows of the average herd to be replaced annually.

*A. G. 454, August 6, 1940.

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VETERINARY

Rabies Vaccination Justified

The new requirements for the manufacture and testing of rabies vaccine constitute a final answer to the critics of vaccination as a means of controlling rabies, because under these requirements no rabies vaccine can be marketed until it has been shown that it is capable of inducing a good degree of immunity to the virus of rabies.

he ne pt

X-d.

The most important thing about the development of a usable testing procedure is that it completes the last link in the chain of evidence in support of vaccinalong felt that field results following the use of rabies vaccine left little to be desired. Every scientific body in the world which has made a careful study of rabies control has recommended vaccination of dogs combined with appropriate sanitary police measures in those areas where infection is known to exist.

The practitioner is completely justified in continuing to recommend routine annual vaccination as a means of controlling rabies.

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